

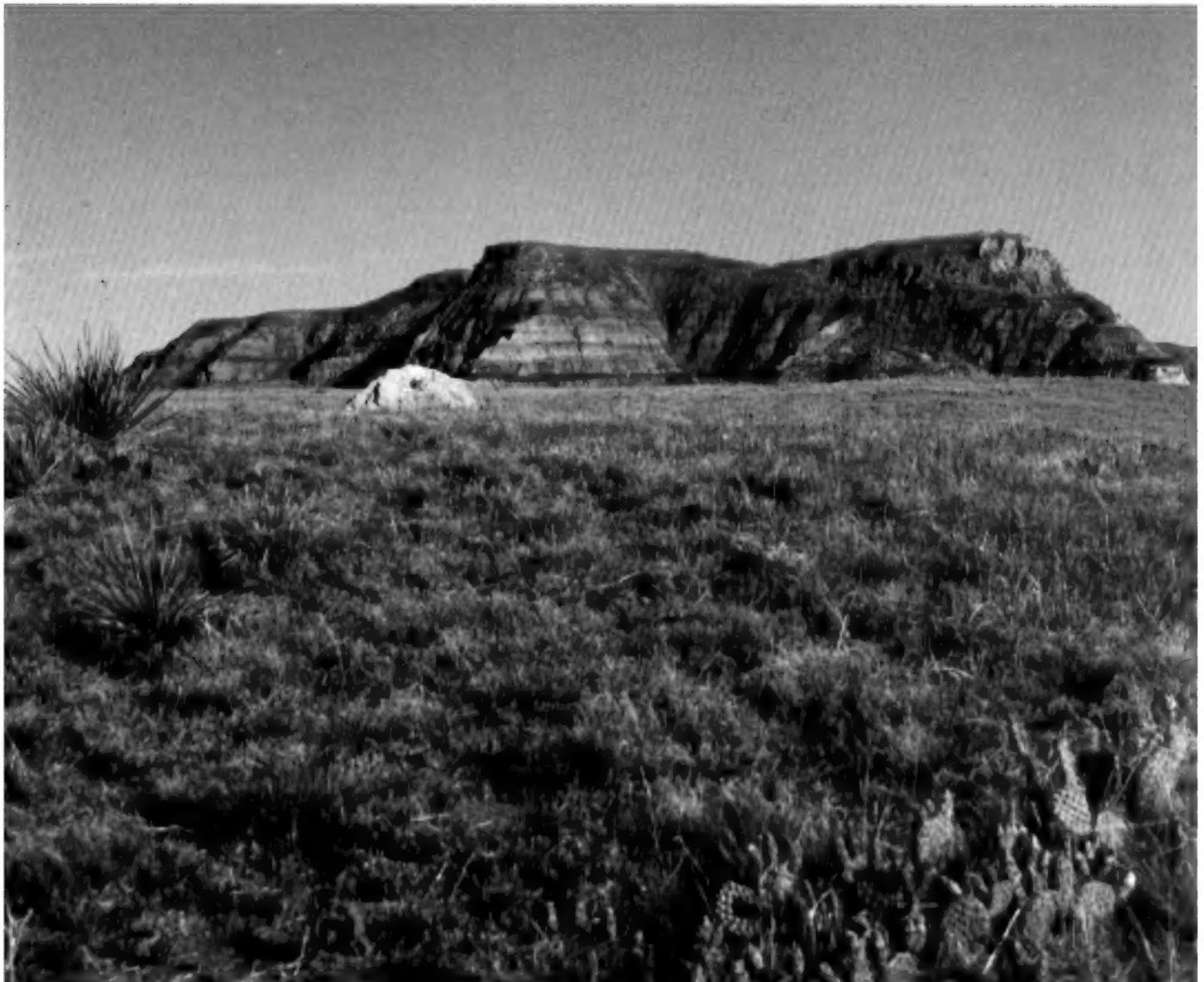


United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
United States Department
of the Interior, Bureau of
Indian Affairs, and South
Dakota Agricultural
Experiment Station

Soil Survey of Corson County, South Dakota



How To Use This Soil Survey

General Soil Map

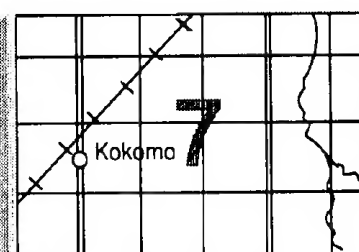
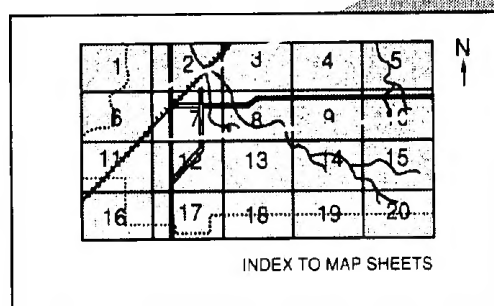
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

Detailed Soil Maps

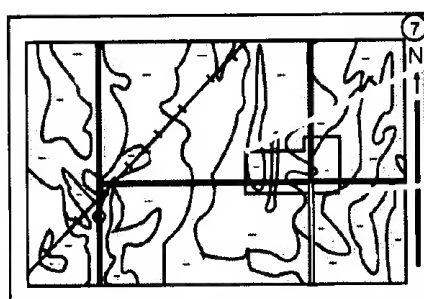
The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.

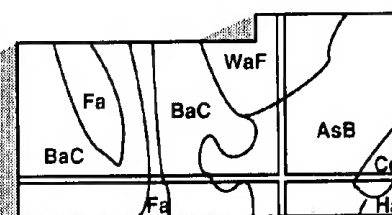


MAP SHEET

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET



NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1985. Soil names and descriptions were approved in 1986. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1986. This survey was made cooperatively by the United States Department of Agriculture, Soil Conservation Service; the United States Department of the Interior, Bureau of Indian Affairs; and the South Dakota Agricultural Experiment Station. It is part of the technical assistance furnished to the Corson County Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: An area of Rock outcrop-Cabba complex, 6 to 40 percent slopes, is in the background. An area of Vebar fine sandy loam, 2 to 6 percent slopes, is in the foreground.

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Foreword

This soil survey contains information that can be used in land-planning programs in Corson County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Dean F. Fisher
State Conservationist
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Soil Survey of Corson County, South Dakota

By Kenneth J. Heil, Soil Conservation Service

Soils surveyed by Roger J. Assmus, Wayne J. Bachman, Ralph E. Bond, Kenneth J. Heil, Kim D. Kempton, Soil Conservation Service; Daniel Anderson, South Dakota State University; and Daryle L. Bennett, South Dakota Division of Conservation

United States Department of Agriculture, Soil Conservation Service,
in cooperation with
the United States Department of the Interior, Bureau of Indian Affairs, and
the South Dakota Agricultural Experiment Station

CORSON COUNTY is in the north-central part of South Dakota (fig. 1). It has a total area of 1,620,794 acres. The entire county is within the Standing Rock Indian Reservation. About 549,728 acres is administered by the Bureau of Indian Affairs. This acreage and areas of private land are intermingled throughout the county.

General Nature of the County

This section gives general information concerning the county. It describes climate; physiography, relief, and drainage; settlement; ranching and farming; and natural resources.

Climate

Corson County is usually warm in summer. Hot days occur frequently during summer, and cool days occur occasionally. In winter very cold periods occur frequently when arctic air moves into the county. Most precipitation falls during warm periods and is normally heaviest in late spring and early summer. Winter snowfalls normally do not occur in large amounts. Because the snow generally is blown into drifts, much of the ground remains free of snow.

Table 1 gives data on temperature and precipitation for the survey area as recorded at McIntosh, South Dakota, in the period 1951 to 1981. Table 2 shows probable dates of the first freeze in fall and the last

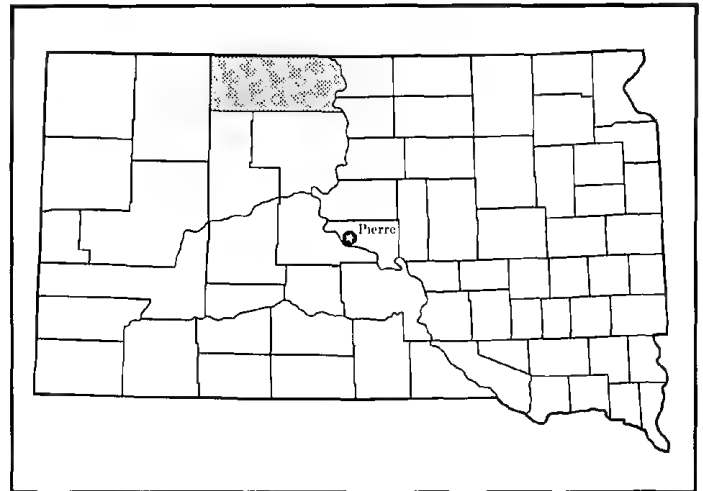


Figure 1.—Location of Corson County in South Dakota.

freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 16 degrees F and the average daily minimum temperature is 6 degrees. The lowest temperature on record, which occurred at McIntosh on January 9, 1977, is -37 degrees. In summer, the average temperature is 70 degrees and the average daily maximum temperature is 83 degrees. The highest recorded temperature, which

occurred at McIntosh on July 11, 1973, is 109 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 16 inches. Of this, 13 inches, or about 80 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 11 inches. The heaviest 1-day rainfall during the period of record was 3.56 inches at McIntosh on June 9, 1964.

Thunderstorms occur on about 34 days each year.

The average seasonal snowfall is about 26 inches. The greatest snow depth at any one time during the period of record was 33 inches. On the average, 52 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 55 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 70 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the north-northwest. Average windspeed is highest, 13 miles per hour, in spring.

Each winter several storms with snow and high winds cause blizzard conditions in the county. During summer thunderstorms, hail occurs in small, scattered areas.

Physiography, Relief, and Drainage

Corson County is part of the Missouri Plateau of the Great Plains (6). Areas along the eastern edge of the county consist of undulating to rolling smooth hills and ridges that are underlain by Pierre Shale. Areas in the rest of the county consist of nearly level plateaus and very steep, isolated buttes that are underlain by sandstone, siltstone, and shale.

The Grand River is the major drainageway in the county. It flows east through the center of the county and drains into Lake Oahe. Numerous other drainageways are intermittent and carry water in spring and after heavy rainfall. They drain into the Grand River and Lake Oahe.

Elevations range from about 1,620 feet above sea level along Lake Oahe to about 2,710 feet on Thunder Hawk Butte in the northwestern part of the county.

Settlement

According to the 1990 census, the population of Corson County is 4,195. McLaughlin, the largest town, has a population of 780. McIntosh, the county seat, has a population of 302. Other communities in the county are Bullhead, Kenel, Keldron, Little Eagle, Mahto, Morristown, Thunderhawk, Trail City, Wakpala, Walker, and Watauga.

Corson County was named in honor of Digton Corson, a Justice of the Supreme Court of South Dakota. It was established by the territorial legislature in 1909. It was organized from the former counties of Schnasse and Boreman (4).

The early inhabitants of the survey area were the Sioux Indians. Lewis and Clark passed through the area in 1804. According to the Fort Laramie Treaty of 1868, the area became part of the Great Sioux Reservation. The Act of 1887 opened the area to white settlers.

South Dakota State Highways 20, 63, 65, and 1806 and U.S. Highway 12 are the main thoroughfares. Many rural areas are served by gravel roads. Rail service is also available.

Ranching and Farming

Ranching is the principal enterprise in Corson County. Beef cattle and sheep are the main livestock. About 77 percent of farm income is derived from the sale of livestock and livestock products (5). Many of the crops grown in the county are used for livestock feed. Most of the small grain is sold as a cash crop.

In 1982, the county had 473 ranches and farms, which averaged about 3,483 acres in size (5). The trend is toward fewer and larger ranches and farms. Many ranchers lease additional grazing land from the Bureau of Indian Affairs.

About 76 percent of the acreage is range, and about 24 percent is used for cultivated crops or for tame pasture and hay (3). Spring wheat, alfalfa, and oats are the main crops. Winter wheat also is grown. Alfalfa, crested wheatgrass, and intermediate wheatgrass are the main crops grown for tame pasture and hay.

The West Corson Soil Conservation District, which included the portion of the county west of Highway 65, and the East Corson Soil Conservation District, which included the rest of the county, were organized in 1951. In 1969, the East Corson County Conservation District disbanded. In 1979, the Corson County Conservation District was formed and includes the entire county. The districts have been instrumental in planting grasses and trees, which help to control erosion. The trees also provide protection for farmsteads and wildlife.

Natural Resources

Soil is the most important natural resource in Corson County. It provides a growing medium for crops and for the grasses grazed by livestock. Other natural resources are water, sand and gravel, and wildlife.

Most of the water for livestock comes from stock water impoundments and wells. Water quantity generally is greater in deep wells, but the quality is poor because of a high content of soluble salts. The Grand River and Lake Oahe are sources of water for livestock, wildlife, and irrigation purposes. The Grand River is perennial. All other drainageways flow only intermittently and can provide water only during periods of snowmelt or high rainfall. Lake Oahe provides opportunities for boating and fishing.

Scattered deposits of sand and gravel are throughout the county. They range from a few inches to many feet in thickness. Because they include an excessive amount of fine rock fragments, such as shale, the sand and gravel are unsuitable as concrete aggregate or as construction material. They are suitable, however, as subgrade material for roads and as bituminous aggregate. The county also has scattered deposits of coal. The coal is low grade and is not mined.

The main wildlife resources are antelope, white-tailed deer, mule deer, sharp-tailed grouse, and gray partridge. Coyote and fox are the main predators. Many stock water impoundments provide bass, bluegill, crappies, and perch for fishing. Walleye, northern pike, and catfish inhabit Lake Oahe.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils

in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on

soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Some of the boundaries on the soil maps of Corson County do not match those on the soil maps of adjacent counties, and some of the soil names and descriptions do not fully agree. The differences are a result of improvements in the classification of soils, particularly modifications or refinements in soil series concepts. Also, there may be differences in the intensity of mapping or in the extent of the soils within the survey area.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in

their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes.

Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soil Descriptions

Gently Sloping to Steep, Clayey Soils on Dissected Plains

These soils dominantly are strongly sloping to steep but are gently sloping and moderately sloping in some areas. They make up about 11 percent of the county. About 93 percent of the acreage is range. Maintaining the most productive grasses is the main concern in managing range. A few areas are used for small grain or alfalfa. Controlling erosion and conserving moisture are the main management concerns in cultivated areas.

1. Sansarc-Dupree-Opal Association

Shallow and moderately deep, well drained, gently sloping to steep, clayey soils on dissected plains

This association is in areas on breaks along Lake Oahe and the Grand River. These areas are dissected by many small draws and entrenched drainageways. Slopes generally are strongly sloping to moderately steep, but they are gently sloping on drainage divides and foot slopes and are steep along some

drainageways. The drainage pattern is well defined.

This association makes up about 6 percent of the survey area. It is about 27 percent Sansarc soils, 27 percent Dupree soils, 22 percent Opal soils, and 24 percent minor soils (fig. 2).

The shallow Sansarc soils are on shoulders. Slopes range from 6 to 40 percent. Typically, the surface layer is grayish brown, calcareous clay. The underlying material is grayish brown, calcareous clay. Bedded shale bedrock is at a depth of about 16 inches.

The shallow Dupree soils are on back slopes and foot slopes. Slopes range from 6 to 30 percent. Typically, the surface layer is gray clay. The subsoil is gray and grayish brown clay. Bedded shale bedrock is at a depth of about 15 inches. The Dupree soils are more acid and firmer than the Sansarc soils.

The moderately deep Opal soils are on back slopes. Slopes range from 2 to 25 percent. Typically, the surface layer is dark grayish brown clay. The subsoil is dark grayish brown and grayish brown, calcareous clay. The underlying material is light brownish gray, calcareous clay. Bedded shale bedrock is at a depth of about 36 inches.

Of minor extent in this association are Bullcreek, Hurley, Promise, Wabek, and Wendte soils; Slickspots; and areas of Rock outcrop. The deep Bullcreek and Promise soils are on foot slopes. The stratified Wendte soils are on high flood plains. The sodium-affected Hurley soils are on foot slopes adjacent to drainageways. The gravelly Wabek soils are on shoulders. The areas of Rock outcrop are intermingled with areas of the Sansarc and Dupree soils. They do not support vegetation. Slickspots are in microlows. They consist of dispersed clay and do not support vegetation.

All of this association is range. Controlling erosion and maintaining the most productive grasses are the main management concerns. The major soils are suited to range. They are not suited to cultivated crops or to tame pasture and hay because of the shallow depth to bedrock and slope. This association has some areas of landslide because of the slope and unstable underlying shale.

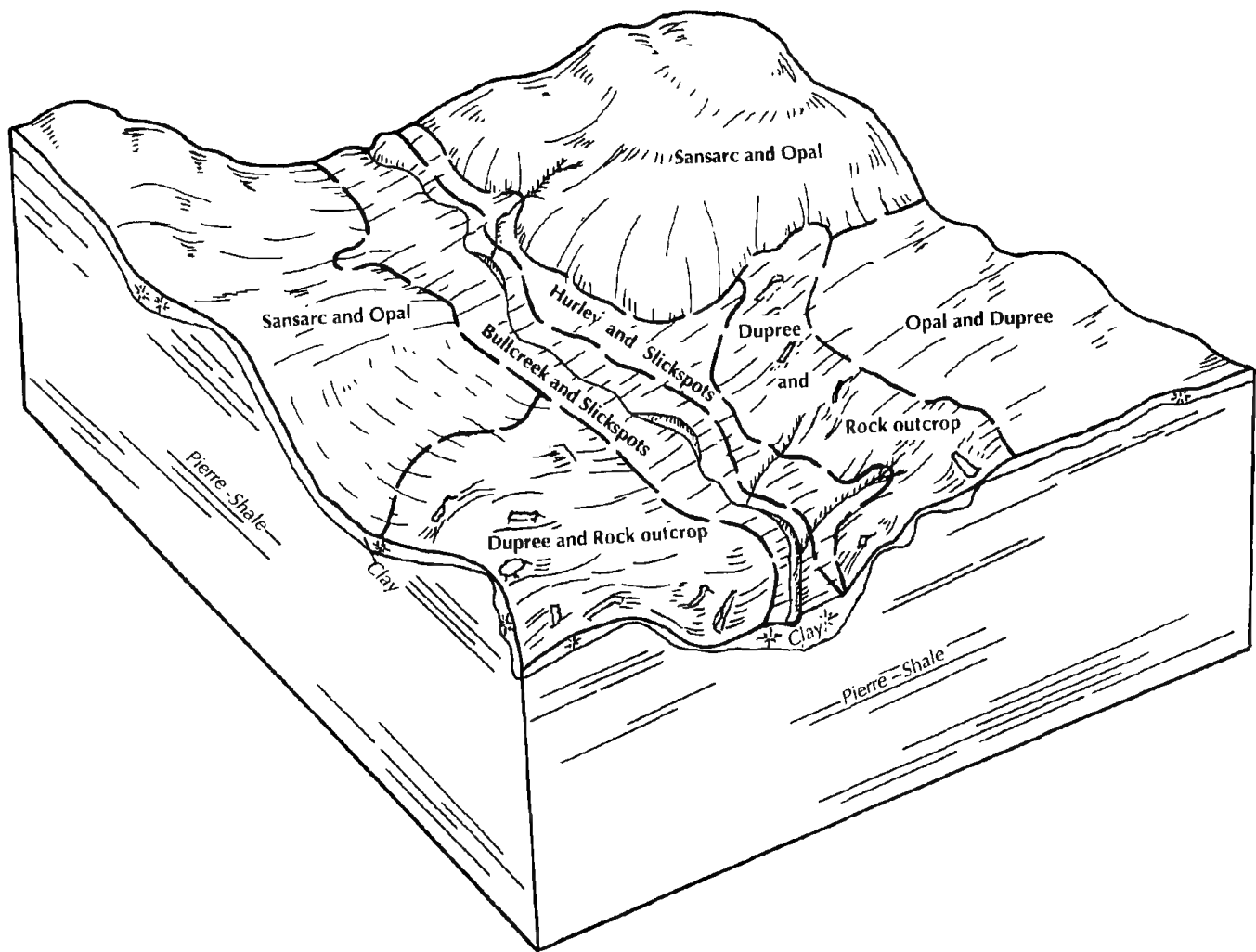


Figure 2.—Pattern of soils and parent material in the Sansarc-Dupree-Opal association.

2. Opal-Sansarc Association

Moderately deep and shallow, well drained, gently sloping to moderately steep, clayey soils on dissected plains

This association is in areas characterized by a series of smooth hills and ridges. These areas have many small draws and prominent drainageways. Slopes generally are gently sloping or moderately sloping but are moderately steep along some drainageways. Glacial stones are on the surface in some areas. The drainage pattern is well defined.

This association makes up about 5 percent of the county. It is about 35 percent Opal and similar soils, 20 percent Sansarc and similar soils, and 45 percent minor soils.

The moderately deep Opal soils are on back slopes.

Slopes range from 2 to 15 percent. Typically, the surface layer is dark grayish brown clay. The subsoil is dark grayish brown and grayish brown, calcareous clay. The underlying material is light brownish gray, calcareous clay. Bedded shale bedrock is at a depth of about 36 inches.

The shallow Sansarc soils are on shoulders. Slopes range from 9 to 25 percent. Typically, the surface layer is grayish brown, calcareous clay. The underlying material is grayish brown, calcareous clay. Bedded shale bedrock is at a depth of about 16 inches.

Of minor extent in this association are Bullcreek, Dupree, Hurley, Promise, and Wendte soils and Slickspots. The deep Bullcreek and Promise soils are on the bottom of drainageways and on foot slopes. The stratified Wendte soils are on high flood plains. The shallow, dense Dupree soils are on back slopes. The

sodium-affected Hurley soils occur in a random pattern throughout areas of the association. Slickspots are in microlows. They consist of dispersed clay and do not support vegetation.

About 85 percent of this association is range. Controlling erosion and maintaining the most productive grasses are the main management concerns. The association is suited to range. A small acreage in areas of the Opal soils and some of the minor soils is used for small grain or alfalfa. The Sansarc soils are not suited to cultivated crops or to tame pasture and hay because of the shallow depth to bedrock.

Nearly Level and Gently Sloping, Loamy Soils on Flood Plains and Terraces

These soils make up about 6 percent of the county. About 90 percent of the acreage is range. Maintaining the most productive grasses is the main concern in managing range. Alfalfa and small grain are the main crops. Conserving moisture, controlling erosion, and improving fertility are the main concerns in managing cultivated areas.

3. Trembles-Havrelon-Korchea Association

Deep, well drained, nearly level to gently sloping, loamy soils on flood plains and terraces

This association is on flood plains and terraces along the major drainageways. Most areas are long and narrow and are dissected by a meandering stream channel. These soils are subject to flooding during snowmelt and after intense rainfall. The flooding usually is of short duration.

This association makes up about 6 percent of the county. It is about 40 percent Trembles soils, 21 percent Havrelon soils, 19 percent Korchea soils, and 20 percent minor soils.

The Trembles soils are on high flood plains and high terraces. Slopes are 0 to 4 percent. Typically, the surface layer is grayish brown fine sandy loam. The underlying material is grayish brown and stratified. It is calcareous fine sandy loam in the upper part and stratified, calcareous loamy fine sand below a depth of 39 inches.

The Havrelon soils are on high flood plains and high terraces. Slopes are 0 to 4 percent. Typically, the surface soil is grayish brown loam and calcareous silt loam. The underlying material is grayish brown and light brownish gray, stratified, calcareous silt loam, loam, and very fine sandy loam.

The Korchea soils are on high flood plains. Slopes are 0 to 2 percent. Typically, the surface layer is dark grayish brown, stratified, calcareous loam. The underlying material is dark grayish brown and olive

brown, stratified, calcareous loam and clay loam.

Of minor extent in this association are Banks, Bullock, Lallie, and Rhoades soils. Banks soils are on low flood plains adjacent to drainage channels. The sodium-affected Bullock and Rhoades soils are on foot slopes adjacent to the flood plains. The poorly drained, saline Lallie soils are on low flood plains or along the side slopes of drainageways.

About 90 percent of this association is range. The major soils are suited to range. Maintaining the most productive grasses is the main concern in managing range. A few areas are used for feed and forage crops for livestock. However, meandering channels, flooding, and damage from floodwaters limit the use of areas for cultivated crops and for tame pasture and hay.

Controlling wind erosion, conserving moisture, and improving fertility are the main concerns in managing cultivated areas. Trees and shrubs in some areas near channels provide excellent cover for wildlife and livestock.

Nearly Level to Steep, Silty and Loamy Soils on Dissected Plains, Other Plains, and Terraces

These soils dominantly are nearly level to rolling but are moderately steep and steep along some drainageways and ridges. They make up about 50 percent of the county. About 62 percent of the acreage is range. Maintaining the most productive grasses is the main concern in managing range. Small grain and alfalfa are the main cultivated crops. Controlling erosion and conserving moisture are the main management concerns.

4. Reeder-Cabba Association

Moderately deep and shallow, well drained, nearly level to steep, loamy soils on dissected plains

This association is in areas characterized by an undulating to rolling landscape interrupted by drainageways and low ridges. Slopes generally are gently sloping and moderately sloping but range from nearly level to steep. The drainage pattern generally is well defined but is poorly defined on nearly level flats and in areas where drainageways terminate in basins.

This association makes up about 21 percent of the survey area. It is about 38 percent Reeder and similar soils, 21 percent Cabba and similar soils, and 41 percent minor soils (fig. 3).

The moderately deep Reeder soils are on back slopes. Slopes range from 0 to 9 percent. Typically, the surface layer is dark grayish brown loam. The subsoil is dark brown, olive brown, and grayish brown clay loam. It is calcareous in the lower part. Soft sandstone bedrock is at a depth of about 34 inches.

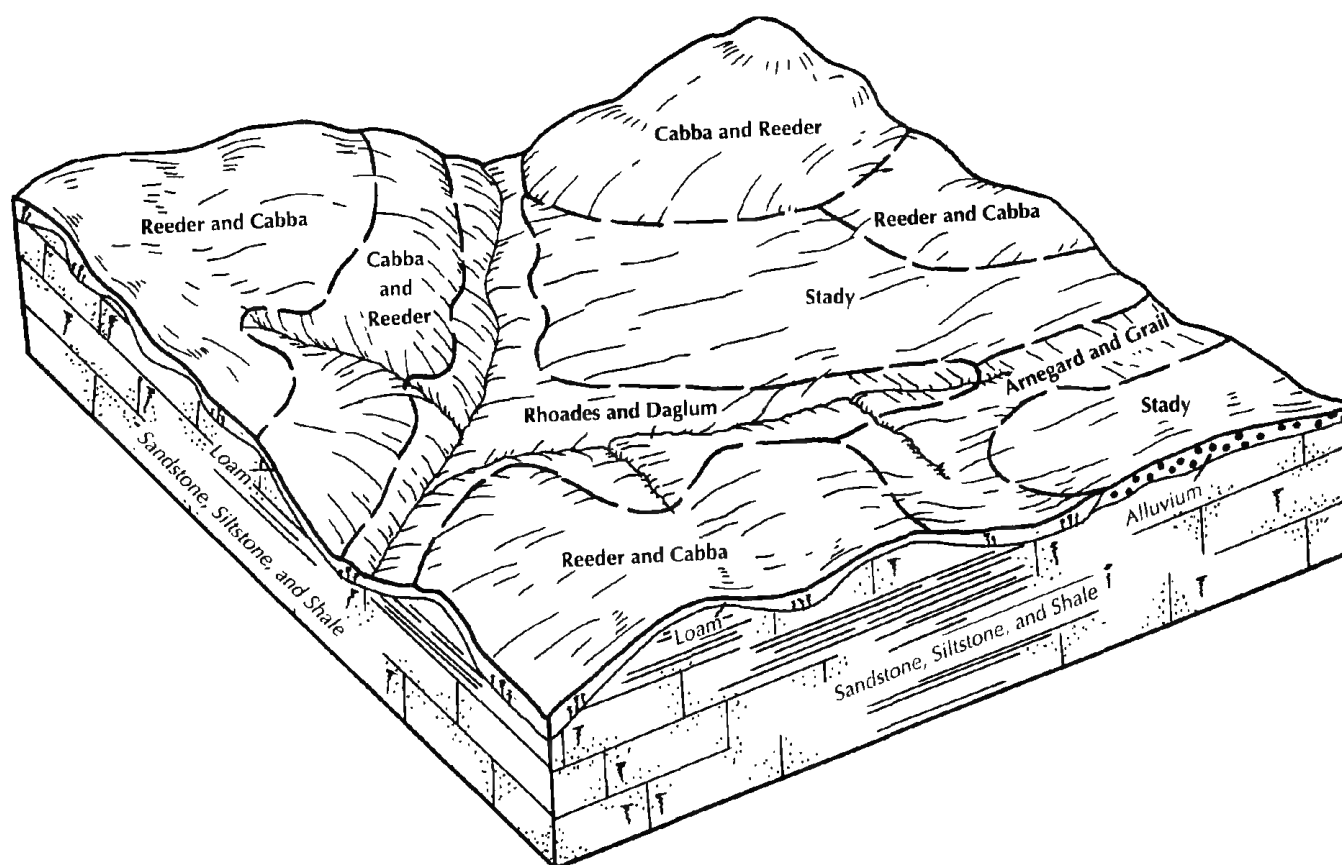


Figure 3.—Pattern of soils and parent material in the Reeder-Cabba association.

The shallow Cabba soils are on shoulders and the upper back slopes. Slopes range from 6 to 40 percent. Typically, the surface layer is dark grayish brown loam. The underlying material is grayish brown, calcareous loam. Grayish brown sandstone bedrock is at a depth of about 10 inches, and siltstone bedrock is at a depth of about 32 inches.

Of minor extent in this association are Arnegard, Daglum, Grail, Rhoades, and Stady soils and Slickspots. Arnegard and Grail soils have a dark surface layer and are on foot slopes. Daglum and Rhoades soils have a sodium-affected subsoil and are on foot slopes. Stady soils are 20 to 40 inches deep to gravelly sand and are on back slopes and foot slopes on terraces. Slickspots are in microlows and are intermingled with areas of the Rhoades soils. They consist of dispersed clay and do not support vegetation.

About 60 percent of this association is range. Maintaining the most productive grasses and controlling erosion and runoff are the main management concerns. The major soils are suited to range. The Reeder soils are suited to cultivated crops and to tame pasture and

hay. The shallow depth to bedrock is a limitation in areas of the Cabba soils. Wheat, oats, and alfalfa are the main crops. Conserving moisture and controlling erosion are the main concerns in managing cultivated areas.

5. Vebar Association

Moderately deep, well drained, nearly level to strongly sloping, loamy soils on dissected plains

This association is in areas characterized by an undulating landscape that is interrupted by hills and ridges. A few buttes and basins are in areas scattered throughout the association. Slopes generally are gently undulating to moderately sloping but range from nearly level to strongly sloping. The steeper areas are along the sides of buttes, ridges, and drainageways. The drainage pattern is well defined except in areas where drainageways terminate on flats or in basins.

This association makes up about 12 percent of the survey area. It is about 55 percent Vebar and similar soils and 45 percent minor soils (fig. 4).

The moderately deep Vebar soils are on back slopes. Slopes range from 0 to 15 percent. Typically, the surface layer is very dark grayish brown fine sandy loam. The subsoil is dark brown and dark yellowish brown fine sandy loam. The underlying material is yellowish brown fine sandy loam. Soft sandstone bedrock is at a depth of about 30 inches.

Of minor extent in this association are Cohagen, Daglum, Ekalaka, Parshall, and Tally soils. The shallow Cohagen soils are on shoulders and the upper back slopes. The deep, sodium-affected Daglum and Ekalaka soils are on foot slopes. The deep Parshall soils have a dark surface layer and are on foot slopes. Tally soils have bedrock below a depth of 40 inches and are on back slopes.

About 70 percent of this association is range. Wind erosion is a severe hazard. The Vebar soils are suited to range, tame pasture and hay, and cultivated crops.

Maintaining the most productive grasses is the main management concern. Small grain and alfalfa are the main crops. Controlling erosion and conserving moisture are the main concerns in managing cultivated areas.

6. Bryant Association

Deep, well drained, nearly level to moderately sloping, silty soils on dissected plains and other plains

This association is in areas characterized by a gently undulating landscape that is dissected by drainageways. A few basins are in areas scattered throughout the association. Slopes generally are gently undulating, but they are nearly level in some areas and are steeper along some ridges and on the sides of some drainageways. The drainage pattern is well defined in most areas, but it is poorly defined on flats or

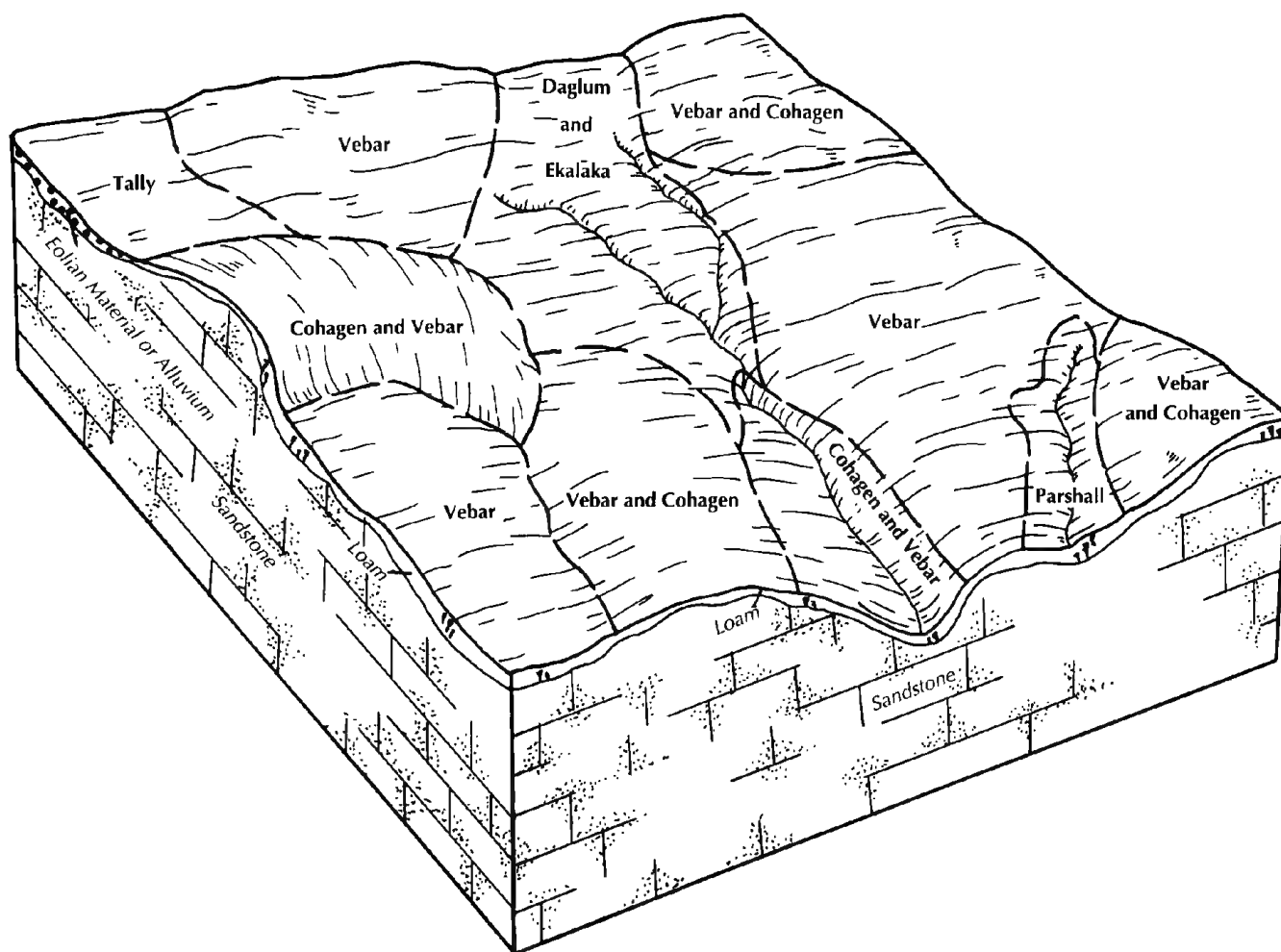


Figure 4.—Pattern of soils and parent material in the Vebar association.

in areas where drainageways terminate in basins.

This association makes up about 3 percent of the county. It is about 41 percent Bryant and similar soils and 59 percent minor soils.

The Bryant soils are on summits and back slopes. Slopes range from 0 to 9 percent. Typically, the surface layer is dark grayish brown silt loam. The subsoil is dark brown, olive brown, and light brownish gray silt loam. It is calcareous in the lower part. The underlying material is light yellowish brown, calcareous silt loam.

Of minor extent in this association are Grail, Grassna, Shambo, and Sutley soils. Grail and Grassna soils have a dark surface layer and are on foot slopes. The loamy Shambo soils are in landscape positions similar to those of the Bryant soils. The calcareous Sutley soils are on shoulders.

About 75 percent of this association is cropland. Some areas are used as range. The Bryant soils are suited to cultivated crops, tame pasture and hay, and range. Small grain and alfalfa are the main crops. Conserving moisture and controlling erosion are the main concerns in managing cultivated crops. Maintaining the most productive grasses is the main concern in managing range.

7. Regent-Reeder Association

Moderately deep, well drained, nearly level to moderately sloping, loamy soils on dissected plains

This association is in areas characterized by low hills, ridges, and shallow drainageways. Slopes generally are gently sloping and moderately sloping but are nearly level in some areas. The drainage pattern is well defined except in the nearly level areas.

This association makes up 8 percent of the county. It is about 27 percent Regent and similar soils, 23 percent Reeder and similar soils, and 50 percent minor soils.

The Regent soils are on back slopes. Slopes range from 0 to 9 percent. Typically, the surface layer is dark grayish brown silty clay loam. The subsoil is dark grayish brown silty clay in the upper part and olive, calcareous silty clay loam in the lower part. The underlying material is olive gray, calcareous silty clay loam. Bedded shale bedrock is at a depth of about 33 inches.

The Reeder soils are on back slopes. Slopes range from 0 to 9 percent. Typically, the surface layer is dark grayish brown loam. The subsoil is dark brown, olive brown, and grayish brown clay loam. It is calcareous in the lower part. Soft sandstone bedrock is at a depth of about 34 inches.

Of minor extent in this association are Arnegard, Daglum, Grail, Rhoades, Savage, and Wayden soils. Arnegard and Grail soils have a dark surface layer and

are on foot slopes. The sodium-affected Daglum and Rhoades soils are intermingled with areas of the major soils and are in similar landscape positions. The deep Savage soils are on foot slopes on fans and terraces. The shallow Wayden soils are on summits, shoulders, and the upper back slopes.

About 65 percent of this association is range. The major soils are suited to cultivated crops, tame pasture and hay, and range. Maintaining the most productive grasses is the main concern in managing range. Small grain and alfalfa are the main crops. Controlling erosion and conserving moisture are the main concerns in managing cultivated areas.

8. Shambo-Farnuf-Stady Association

Deep, well drained, nearly level to moderately sloping, loamy soils on terraces

This association is on terraces. Slopes generally are nearly level or gently sloping but are steeper on some terrace fronts. The drainage pattern is poorly defined.

This association makes up about 6 percent of the county. It is about 34 percent Shambo soils, 19 percent Farnuf soils, 12 percent Stady soils, and 35 percent minor soils.

The Shambo soils have slopes of 0 to 9 percent. Typically, the surface layer is dark grayish brown loam. The subsoil is brown, olive brown, and grayish brown loam. It is calcareous in the lower part. The underlying material is grayish brown, calcareous loam. It is stratified in the lower part.

The Farnuf soils have slopes of 0 to 6 percent. Typically, the surface layer is dark grayish brown loam. The subsoil is dark brown clay loam in the upper part and light brownish gray, calcareous clay loam and loam in the lower part. The underlying material is grayish brown, calcareous loam.

The Stady soils have slopes of 0 to 6 percent. Typically, the surface layer is dark grayish brown loam. The subsoil is dark brown and grayish brown loam. It is calcareous in the lower part. The underlying material is dark gray, calcareous gravelly sand.

Of minor extent in this association are Arnegard, Daglum, Lehr, Rhoades, and Tally soils. Arnegard soils have a dark surface layer and are on foot slopes. The sodium-affected Daglum and Rhoades soils are intermingled with areas of the major soils. Lehr soils have gravelly sand at a depth of 14 to 20 inches and are on back slopes. Tally soils have more sand in the subsoil than the major soils. They are in landscape positions similar to those of the major soils.

About 60 percent of this association is range. Maintaining the most productive grasses is the main concern in managing range. The major soils are suited

to cultivated crops, tame pasture and hay, and range. Small grain and alfalfa are the main crops. Controlling erosion and conserving moisture are the main concerns in managing cultivated areas.

Gently Sloping to Very Steep, Loamy Soils on Dissected Plains

These soils dominantly are strongly sloping to very steep but are gently sloping and moderately sloping in some areas. They make up about 7 percent of the county. All of the acreage is range. Maintaining the most productive grasses is the main concern in managing range. A few small areas are used for small grain or alfalfa. Controlling erosion and conserving moisture are the main concerns in managing cultivated areas.

9. Cabba-Wayden Association

Shallow, well drained, strongly sloping to steep, loamy soils on dissected plains

This association is on back slopes and ridges along large, upland drainageways. Slopes generally are strongly sloping to steep but are moderately sloping on some foot slopes and very steep along some drainageways. The drainage pattern is well defined.

This association makes up about 3 percent of the survey area. It is about 38 percent Cabba and similar soils, 17 percent Wayden and similar soils, and 45 percent minor soils.

The Cabba soils are on shoulders and the upper back slopes. Slopes range from 9 to 40 percent. Typically, the surface layer is dark grayish brown loam. The underlying material is grayish brown, calcareous loam. Grayish brown, calcareous sandstone bedrock is at a depth of about 10 inches, and siltstone bedrock is at a depth of more than 32 inches.

The Wayden soils are on the upper back slopes. Slopes range from 9 to 40 percent. Typically, the surface layer is grayish brown silty clay loam. The underlying material is olive, calcareous silty clay loam. Calcareous, bedded shale bedrock is at a depth of more than 18 inches.

Of minor extent in this association are Amor, Regent, and Wabek soils and areas of Rock outcrop. The moderately deep Amor and Regent soils are on back slopes. The gravelly Wabek soils are on summits and shoulders along ridgetops and on terrace scarps. The areas of Rock outcrop consist of exposed bedrock and do not support vegetation.

All of this association is range. Maintaining the most productive grasses and controlling erosion and runoff are the main management concerns. The major soils are suited to range. They are not suited to cultivated

crops or to tame pasture and hay because of the slope, shallow depth to bedrock, and, in places, numerous boulders. Some of the drainageways support a moderate to dense stand of shrubs and trees. The shrubs and trees provide shelter for livestock and shelter and browse for wildlife.

10. Flasher-Vebar Association

Shallow and moderately deep, excessively drained to well drained, moderately sloping to very steep, loamy soils on dissected plains

This association is in areas characterized by hills, ridges, and breaks to major drainageways. Slopes generally are moderately steep and steep but are moderately sloping on foot slopes and very steep on some ridges. Outcrops of hard siltstone or sandstone cap some ridges. The drainage pattern is well defined.

This association makes up about 4 percent of the survey area. It is about 32 percent Flasher and similar soils, 20 percent Vebar and similar soils, and 48 percent minor soils (fig. 5).

The shallow, excessively drained Flasher soils are on summits and shoulders. Slopes range from 15 to 60 percent. Typically, the surface layer is dark grayish brown fine sandy loam. The underlying material is olive brown loamy fine sand. Soft sandstone bedrock is at a depth of more than 9 inches.

The moderately deep, well drained Vebar soils are on back slopes. Slopes range from 6 to 15 percent. Typically, the surface layer is very dark grayish brown fine sandy loam. The subsoil is dark brown and dark yellowish brown fine sandy loam. The underlying material is yellowish brown fine sandy loam. Soft sandstone bedrock is at a depth of about 30 inches.

Of minor extent in this association are the shallow, well drained Cabba and Cohagen soils on the upper convex slopes and the deep Telfer soils on shoulders and the upper back slopes.

All of this association is range. Controlling erosion and runoff is the main management concern. The major soils are suited to range. They are not suited to cultivated crops or to tame pasture and hay because of the slope and shallow depth to bedrock. Some of the drainageways support a low to moderate stand of shrubs and trees. The trees and shrubs provide shelter for livestock and shelter and browse for wildlife.

Nearly Level to Strongly Sloping, Loamy Soils That Have a Claypan and Other Loamy Soils; on Dissected Plains and Other Plains

These soils dominantly are nearly level to strongly sloping but are moderately steep in some areas. They make up about 26 percent of the county. About 88

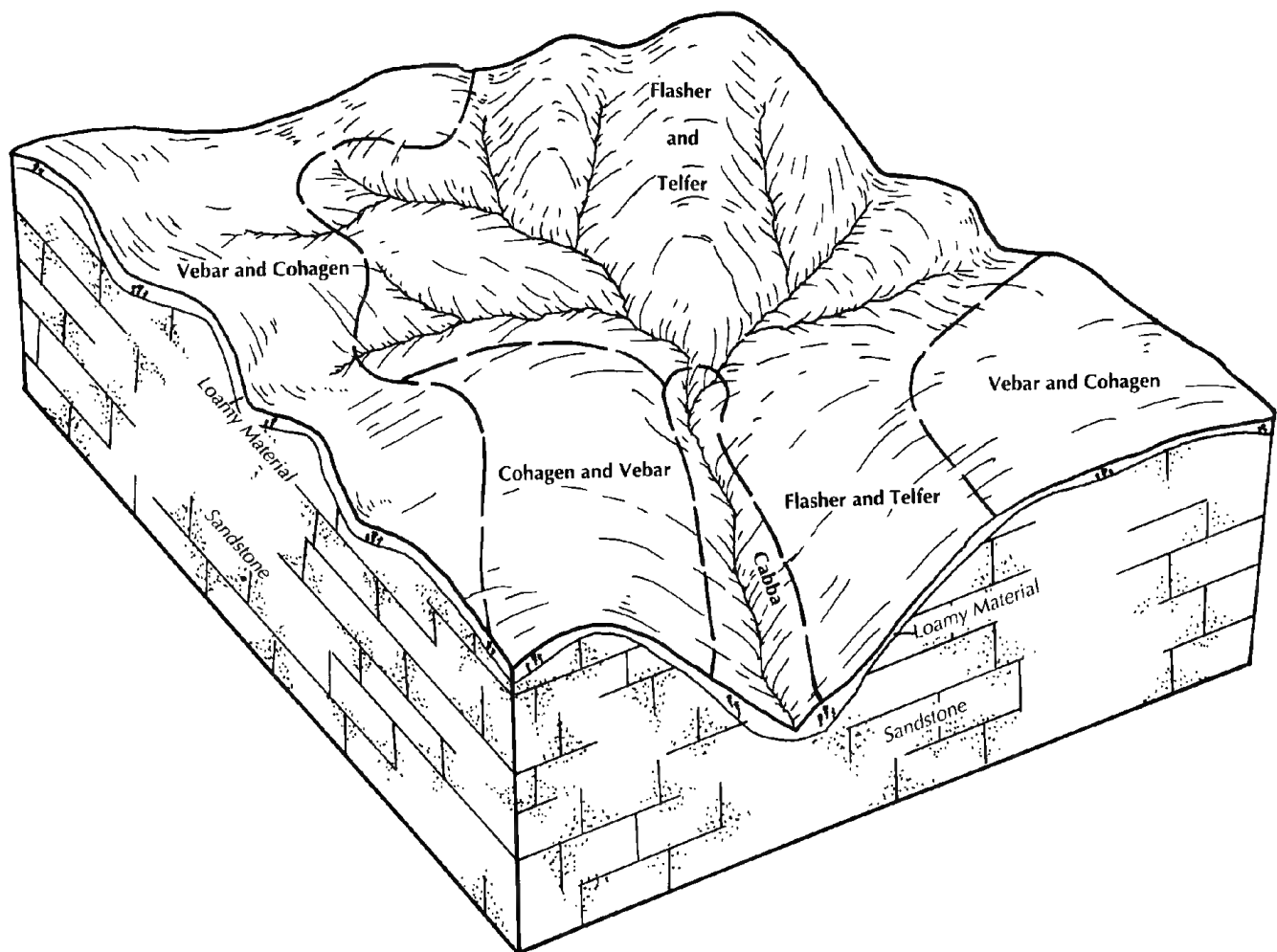


Figure 5.—Pattern of soils and parent material in the Flasher-Vebar association.

percent of the acreage is range. Maintaining the most productive grasses is the main concern in managing range. A few areas are used for small grain or alfalfa. Controlling erosion and conserving moisture are the main management concerns in cultivated areas.

11. Rhoades-Daglum-Reeder Association

Deep and moderately deep, well drained, nearly level to moderately sloping, loamy soils on dissected plains and other plains

This association is in areas characterized by low hills and ridges. Slopes generally are gently sloping and moderately sloping but are nearly level in some areas and steeper along the sides of drainageways. The drainage pattern is well defined.

This association makes up about 12 percent of the survey area. It is about 27 percent Rhoades soils, 25

percent Daglum soils, 11 percent Reeder soils, and 37 percent minor soils.

The deep Rhoades soils are on foot slopes and toe slopes. Slopes range from 0 to 9 percent. Typically, the surface layer is dark grayish brown loam. The subsoil is grayish brown clay loam. It contains salts at a depth of 10 inches and is calcareous in the lower part. The underlying material is grayish brown clay loam. Bedded shale bedrock is at a depth of about 49 inches.

The deep Daglum soils are on foot slopes. Slopes range from 0 to 6 percent. Typically, the surface layer is dark grayish brown loam. The subsurface layer is light brownish gray loam. The subsoil is dark grayish brown and grayish brown clay. It is calcareous in the lower part. The underlying material is grayish brown and light olive brown, calcareous clay loam.

The moderately deep Reeder soils are on back slopes. Slopes range from 0 to 9 percent. Typically, the

surface layer is dark grayish brown loam. The subsoil is dark brown, olive brown, and grayish brown clay loam. It is calcareous in the lower part. Soft sandstone bedrock is at a depth of about 34 inches.

Of minor extent in this association are Belfield, Havrelon, Lallie, Regent, and Vebar soils and Slickspots. The sodium-affected Belfield soils are in landscape positions similar to those of the Daglum soils. The calcareous Havrelon soils are on high flood plains or high terraces along narrow drainageways. The poorly drained Lallie soils are on low flood plains along narrow drainageways. The silty Regent soils are in landscape positions similar to those of the Reeder soils. Vebar soils have more sand and less clay throughout than the Reeder soils and are on back slopes. Slickspots do not support vegetation and are intermingled with areas of the Rhoades and Daglum soils.

About 85 percent of this association is range. Maintaining the most productive grasses is the main

management concern. The major soils are suited to range. The Rhoades soils are not suited to cultivated crops or to tame pasture and hay because of the sodium-affected subsoil. A small acreage in areas of the Daglum and Reeder soils and some of the minor soils is used for feed and forage crops for livestock. Controlling erosion, conserving moisture, and overcoming the sodium-affected subsoil are the main concerns in managing cultivated areas.

12. Bullock-Parchin Association

Moderately deep, well drained, nearly level to strongly sloping, loamy soils on dissected plains and other plains

This association is in areas characterized by low ridges and flats. Slopes generally are nearly level to moderately sloping but are steeper along the sides of drainageways. The drainage pattern is well defined except in areas where drainageways terminate on flats or nearly level terraces.

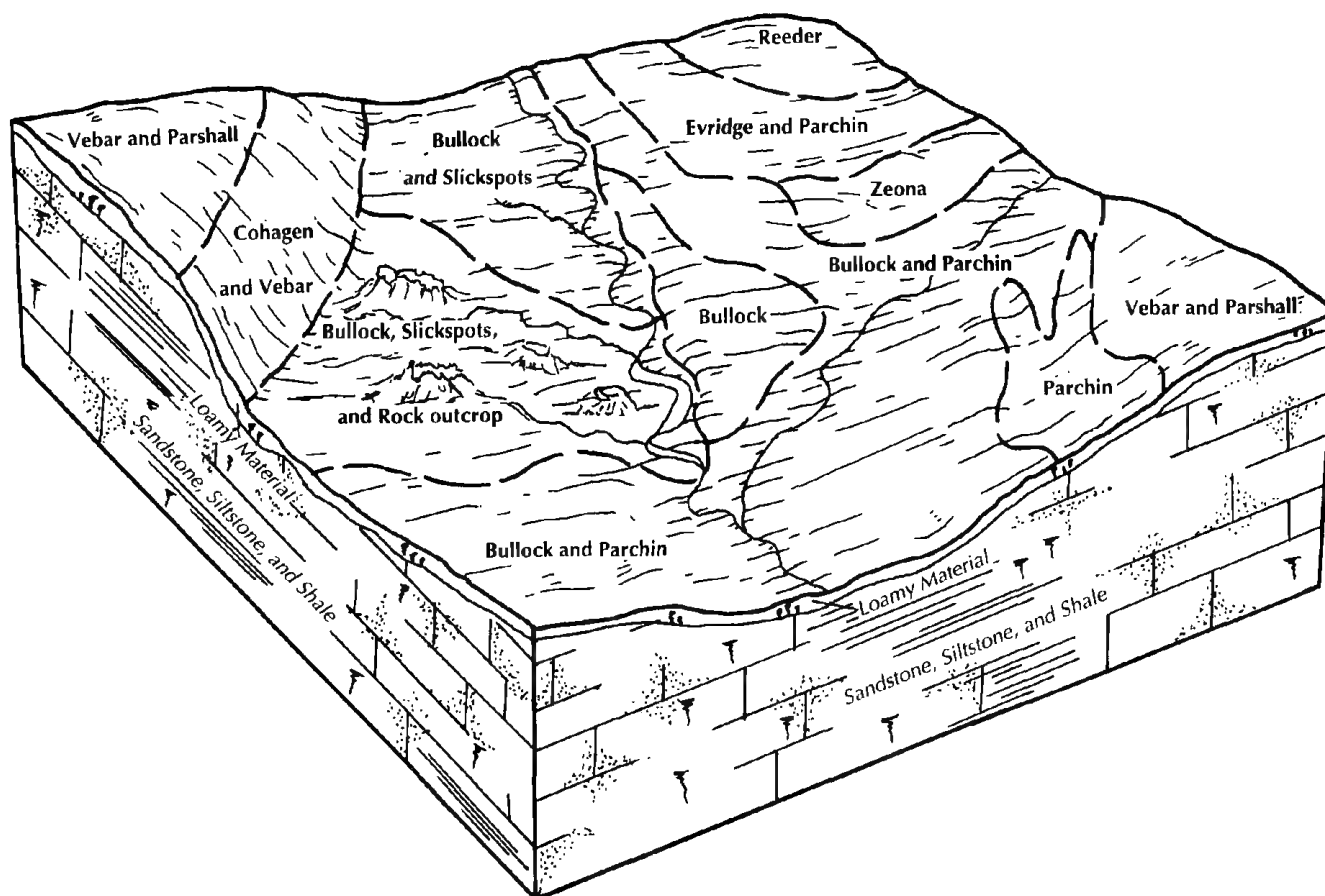


Figure 6.—Pattern of soils and parent material in the Bullock-Parchin association.

This association makes up about 14 percent of the survey area. It is about 32 percent Bullock and similar soils, 17 percent Parchin and similar soils, and 51 percent minor soils (fig. 6).

The Bullock soils are on the lower parts of the landscape. Slopes range from 0 to 15 percent. Typically, the surface layer is grayish brown fine sandy loam. The subsoil is grayish brown sandy clay loam and sandy loam. It has accumulations of carbonate and salts in the lower part. The underlying material is light brownish gray, calcareous clay loam. Calcareous sandstone bedrock is at a depth of about 23 inches.

The Parchin soils generally are on back slopes and foot slopes. Slopes range from 0 to 9 percent. Typically, the surface layer is grayish brown fine sandy loam. The subsurface layer is grayish brown fine sandy loam. The subsoil is brown sandy clay loam and fine sandy loam. It is calcareous in the lower part. Calcareous, soft sandstone bedrock is at a depth of about 24 inches.

Of minor extent in this association are Cohagen, Evridge, Parshall, Reeder, Regent, Vebar, and Zeona

soils; Slickspots; and areas of Rock outcrop. The shallow Cohagen soils are on shoulders and the upper back slopes along the steep side slopes of drainageways. Evridge soils have a surface layer that is thicker than that of the Bullock and Parchin soils and are intermingled with areas of the major soils. The deep Parshall soils are on foot slopes. Reeder, Regent, and Vebar soils do not have a sodium-affected subsoil and are on back slopes. The excessively drained Zeona soils are on back slopes in hummocky areas. The areas of Rock outcrop consist of exposed bedrock and do not support vegetation. Slickspots are in microlows. They consist of dispersed clay and do not support vegetation.

About 90 percent of this association is range. Controlling erosion and maintaining the most productive grasses are the main management concerns. The major soils are suited to range. A small acreage in areas of the Parchin soils and some of the minor soils is used for feed and forage crops for livestock. Wind erosion and the low available water capacity are the main concerns in managing cultivated areas.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under the heading "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Reeder loam, 0 to 2 percent slopes, is a phase of the Reeder series.

Some map units are made up of two or more major soils. These map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of two or more soils, or one or more soils and a miscellaneous area, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Rhoades-Daglum-Slickspots complex, 0 to 9 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made

for use and management. The pattern and proportion of the soils in the mapped areas are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Wayden and Cabba soils, 6 to 40 percent slopes, extremely stony, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Badland is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Some of the boundaries on the soil maps of Corson County do not match those on the soil maps of adjacent counties, and some of the soil names and descriptions do not fully agree. The differences are a result of improvements in the classification of soils, particularly modifications or refinements in soil series concepts. Also, there may be differences in the intensity of mapping or in the extent of the soils within the survey area.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The "Glossary" defines many of the terms used in describing the soils.

Soil Descriptions

An—Arnegard loam

Composition

Arnegard soil and similar inclusions: 90 to 99 percent
Contrasting inclusions: 1 to 10 percent

Setting

Landform: Plains

Landscape position: Foot slopes

Slope range: 0 to 2 percent

Shape of areas: Long and narrow or irregular

Size of areas: 10 to 50 acres

Typical Profile

Surface layer:

0 to 9 inches—very dark gray loam

Subsoil:

9 to 38 inches—very dark grayish brown and dark grayish brown loam

38 to 47 inches—dark brown loam

47 to 55 inches—brown, calcareous loam

Underlying layer:

55 to 60 inches—grayish brown, calcareous loam

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: 3 to 6 feet

Flooding: None

Permeability: Moderate

Available water capacity: High

Organic matter content: Moderate

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- Farnuf, Reeder, and Shambo soils, which are not dark below a depth of 16 inches and are higher on the landscape than the Arnegard soil

Similar inclusions:

- Soils that have more clay or less clay in the subsoil than the Arnegard soil

Use and Management**Cropland and pasture**

Main crops: Wheat, oats, and alfalfa

Management concerns: Moisture conservation

Management measures:

- Minimizing tillage and leaving crop residue on the surface help to conserve moisture and maintain tilth and the content of organic matter.

Interpretive Groups

Land capability classification: IIc-3

Range site: Loamy Overflow

Windbreak suitability group: 1

Pasture suitability group: K

Bb—Badland**Composition**

Badland and similar inclusions: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Dissected plains

Landscape position: Shoulders and back slopes

Slope range: 0 to 40 percent

Shape of areas: Irregular

Size of areas: 20 to 200 acres

Typical Profile

- Badland consists of eroding exposures of soft shale, siltstone, and sandstone at the head of drainageways and on the sides of ridges and knolls (fig. 7).
- Vertical walls or escarpments that are several hundred feet high are common.
- Deep, narrow gullies are in the low landscape positions.

Soil Properties and Qualities

Depth to a contrasting or impervious layer: Soft bedrock at the surface

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Surface runoff: Very rapid

Inclusions

Contrasting inclusions:

- The loamy Cabba soils, which are 10 to 20 inches deep over soft bedrock and are in the less sloping, grass-covered areas
- The sandy Flasher soils, which are 7 to 20 inches deep over soft sandstone and are in the less sloping, grass-covered areas
- Wabek soils, which are 7 to 14 inches deep over sand and gravel and are in the less sloping, grass-covered areas
- The clayey Wayden soils, which are 10 to 20 inches deep over soft bedrock and are in the less sloping, grass-covered areas

Use and Management**Cropland and pasture**

General management considerations:

- Areas of this map unit are unsuited to cropland.
- Nearly all areas are used as wildlife habitat.
- The areas of wildlife habitat generally are scenic and provide excellent opportunities for sightseeing and hiking.
- Some areas of the included soils could provide grazing for livestock, but most of these areas are small and inaccessible.



Figure 7.—An area of Badland. Rhoades-Daglum loams, 0 to 9 percent slopes, are on the lower part of the landscape.

Interpretive Groups

Land capability classification: VIIIIs-2

Range site: None assigned

Windbreak suitability group: 10

Pasture suitability group: NS

Bd—Banks fine sand

Composition

Banks soil and similar inclusions: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Flood plains

Landscape position: Low flood plains

Slope range: 0 to 2 percent

Shape of areas: Long and narrow or irregular

Size of areas: 10 to 200 acres

Typical Profile

Surface layer:

0 to 3 inches—dark grayish brown fine sand

Underlying layer:

3 to 37 inches—multicolored, calcareous, stratified fine sand and coarse sand

37 to 60 inches—grayish brown, calcareous fine sand

Soil Properties and Qualities

Drainage class: Excessively drained and somewhat excessively drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: Frequency—frequent; duration—brief

Permeability: Rapid

Available water capacity: Low

Organic matter content: Low

Surface runoff: Very slow

Inclusions

Contrasting inclusions:

- Trembles soils, which have less sand than the Banks soil and are higher on the landscape
- Areas of riverwash, which are recent stream deposits and are adjacent to stream channels

Use and Management

Cropland and pasture

General management considerations:

- The soil is unsuited to cropland.

Management concerns: Wind erosion, the low available water capacity

Management measures:

- Proper grazing management helps to maintain plant vigor, conserve moisture, and control erosion.

Interpretive Groups

Land capability classification: Vle-8

Range site: Sands

Windbreak suitability group: 7

Pasture suitability group: NS

BeA—Belfield-Daglum complex, 0 to 3 percent slopes

Composition

Belfield soil and similar inclusions: 55 to 70 percent

Daglum soil and similar inclusions: 25 to 35 percent

Contrasting inclusions: 5 to 20 percent

Setting

Landform: Plains

Landscape position: Belfield—the lower back slopes and foot slopes; Daglum—foot slopes

Slope range: 0 to 3 percent

Shape of areas: Irregular

Size of areas: 10 to 80 acres

Typical Profile

Belfield

Surface layer:

0 to 6 inches—dark grayish brown silty clay loam

Subsurface layer:

6 to 10 inches—dark grayish brown silty clay loam that has light brownish gray silt coatings

Subsoil:

10 to 20 inches—dark grayish brown silty clay

20 to 36 inches—grayish brown, calcareous silty clay loam

Underlying layer:

36 to 45 inches—grayish brown, calcareous silty clay loam

45 to 60 inches—soft siltstone and shale

Daglum

Surface layer:

0 to 5 inches—dark grayish brown loam

Subsurface layer:

5 to 7 inches—light brownish gray loam

Subsoil:

7 to 16 inches—dark grayish brown clay

16 to 25 inches—grayish brown, calcareous clay that has accumulations of salts

Underlying layer:

25 to 36 inches—grayish brown, calcareous clay loam that has accumulations of salts

36 to 60 inches—light olive brown, calcareous clay loam

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: Belfield—40 to more than 60 inches to soft siltstone and shale; Daglum—40 to more than 60 inches to shale

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Belfield—slow; Daglum—very slow

Available water capacity: Moderate

Organic matter content: Moderate

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- Farnuf, Reeder, Regent, and Shambo soils, which do not have a sodium-affected subsoil and are higher on the landscape than the Belfield and Daglum soils
- The sodium-affected Rhoades soils, which have visible salts within a depth of 16 inches and are in microlows on foot slopes
- The sodium-affected Slickspots in microlows on the lower foot slopes

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: A sodium-affected subsoil that adversely affects crop growth by restricting root penetration, a slow rate of water intake

Management measures:

- Minimizing tillage, leaving crop residue on the surface, and including grasses and legumes in the cropping system help to conserve moisture and maintain the content of organic matter.
- Chiseling and subsoiling improve tilth and increase the rate of water intake.

Interpretive Groups

Land capability classification: Belfield—IIIs-1; Daglum—IVs-2

Range site: Belfield—Clayey; Daglum—Claypan

Windbreak suitability group: Belfield—4; Daglum—9

Pasture suitability group: Belfield—E; Daglum—C

BfA—Bryant silt loam, 0 to 2 percent slopes

Composition

Bryant soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Plains

Landscape position: Summits and back slopes

Slope range: 0 to 2 percent

Shape of areas: Irregular

Size of areas: 10 to 80 acres

Typical Profile

Surface layer:

0 to 6 inches—dark grayish brown silt loam

Subsoil:

6 to 20 inches—dark brown and olive brown silt loam

20 to 34 inches—light brownish gray, calcareous silt loam

Underlying layer:

34 to 60 inches—light yellowish brown, calcareous silt loam

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderate

Available water capacity: High

Organic matter content: Moderate

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- Grassna soils, which are dark to a depth of more than 16 inches and are on foot slopes
- Reeder soils, which have more sand than the Bryant soil and are higher on the landscape

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Lack of moisture for long-season crops

Management measures:

- Minimizing tillage and leaving crop residue on the surface help to conserve moisture and maintain tilth and the content of organic matter.

Interpretive Groups

Land capability classification: IIc-2

Range site: Silty

Windbreak suitability group: 3

Pasture suitability group: F

BfB—Bryant silt loam, 2 to 6 percent slopes

Composition

Bryant soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Plains

Landscape position: Summits and back slopes

Slope range: 2 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 200 acres

Typical Profile

Surface layer:

0 to 6 inches—dark grayish brown silt loam

Subsoil:

6 to 20 inches—dark brown and olive brown silt loam

20 to 34 inches—light brownish gray, calcareous silt loam

Underlying layer:

34 to 60 inches—light yellowish brown, calcareous silt loam

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderate

Available water capacity: High

Organic matter content: Moderate

Surface runoff: Medium

Inclusions

Contrasting inclusions:

- Grassna soils, which are dark to a depth of more than 16 inches and are on foot slopes
- Reeder soils, which have more sand than the Bryant soil and are higher on the landscape
- Sutley soils, which have carbonates at a depth of less than 10 inches and are on shoulders

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Water erosion

Management measures:

- Minimizing tillage and leaving crop residue on the surface help to conserve moisture, control erosion, and maintain tilth and the content of organic matter.
- Contour farming and grassed waterways help to control water erosion.

Interpretive Groups

Land capability classification: IIe-1

Range site: Silty

Windbreak suitability group: 3

Pasture suitability group: F

BgB—Bryant-Sutley silt loams, 2 to 6 percent slopes

Composition

Bryant soil and similar inclusions: 50 to 60 percent

Sutley soil and similar inclusions: 25 to 35 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Plains

Landscape position: Bryant—back slopes; Sutley—summits and shoulders

Slope range: 2 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 150 acres

Typical Profile

Bryant

Surface layer:

0 to 6 inches—dark grayish brown silt loam

Subsoil:

6 to 20 inches—dark brown and olive brown silt loam

20 to 34 inches—light brownish gray, calcareous silt loam

Underlying layer:

34 to 60 inches—light yellowish brown, calcareous silt loam

Sutley

Surface layer:

0 to 6 inches—grayish brown, calcareous silt loam

Subsoil:

6 to 21 inches—light brownish gray, calcareous silt loam

Underlying layer:

21 to 60 inches—light brownish gray, calcareous silt loam

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderate

Available water capacity: High

Organic matter content: Moderate

Surface runoff: Medium

Inclusions

Contrasting inclusions:

- Grassna soils, which are dark to a depth of more than 16 inches and are on foot slopes
- The sodium-affected Heil soils in basins

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Bryant—water erosion; Sutley—wind erosion, water erosion, a high content of lime that adversely affects the availability of plant nutrients

Management measures:

- Minimizing tillage, leaving crop residue on the surface, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain fertility, tilth, and the content of organic matter.
- Contour farming and grassed waterways help to control water erosion.

Interpretive Groups

Land capability classification: Bryant—IIe-1; Sutley—IIe-1

Range site: Bryant—Silty; Sutley—Thin Upland

Windbreak suitability group: Bryant—3; Sutley—8

Pasture suitability group: Bryant—F; Sutley—G

BgC—Bryant-Sutley silt loams, 6 to 9 percent slopes

Composition

Bryant soil and similar inclusions: 45 to 55 percent

Sutley soil and similar inclusions: 30 to 40 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Dissected plains

Landscape position: Bryant—back slopes; Sutley—summits and shoulders

Slope range: 6 to 9 percent

Shape of areas: Irregular

Size of areas: 10 to 150 acres

Typical Profile

Bryant

Surface layer:

0 to 6 inches—dark grayish brown silt loam

Subsoil:

6 to 20 inches—dark brown and olive brown silt loam

20 to 34 inches—light brownish gray, calcareous silt loam

Underlying layer:

34 to 60 inches—light yellowish brown, calcareous silt loam

Sutley

Surface layer:

0 to 6 inches—grayish brown, calcareous silt loam

Subsoil:

6 to 21 inches—light brownish gray, calcareous silt loam

Underlying layer:

21 to 60 inches—light brownish gray, calcareous silt loam

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderate

Available water capacity: High

Organic matter content: Moderate

Surface runoff: Medium

Inclusions

Contrasting inclusions:

- Grassna soils, which are dark to a depth of more than 16 inches and are on foot slopes
- The sodium-affected Heil soils in basins
- Reeder soils, which have more sand in the subsoil than the Bryant soil and are in similar landscape positions

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Bryant—water erosion; Sutley—wind erosion, water erosion, a high content of lime that adversely affects the availability of plant nutrients

Management measures:

- Minimizing tillage, leaving crop residue on the surface, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain fertility, tilth, and the content of organic matter.
- Contour farming, terraces, and grassed waterways help to control erosion.
- In some areas slopes are too short and too irregular for contouring and terracing.

Interpretive Groups

Land capability classification: Bryant—IIe-1; Sutley—IVe-1

Range site: Bryant—Silty; Sutley—Thin Upland

Windbreak suitability group: Bryant—3; Sutley—8

Pasture suitability group: Bryant—F; Sutley—G

BIA—Bullcreek clay, 0 to 4 percent slopes

Composition

Bullcreek soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landform: Fans and terraces

Landscape position: Foot slopes

Slope range: 0 to 4 percent

Shape of areas: Long and narrow or irregular

Size of areas: 10 to 150 acres

Typical Profile

Surface layer:

0 to 1 inch—grayish brown, calcareous clay

Subsoil:

1 to 10 inches—grayish brown, calcareous clay
 10 to 19 inches—grayish brown, calcareous clay that
 has accumulations of salts

Underlying layer:

19 to 60 inches—grayish brown, calcareous clay

Soil Properties and Qualities

Drainage class: Well drained and moderately well
 drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60
 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Very slow

Available water capacity: Low

Organic matter content: Moderately low

Surface runoff: Medium

Inclusions**Contrasting inclusions:**

- The sodium-affected Hurley soils on the lower foot slopes
- The poorly drained Lallie soils and moderately well drained Wendte soils on flood plains
- Promise soils, which do not have salts and are higher on the landscape than the Bullcreek soil
- The sodium-affected Slickspots in microlows on the lower foot slopes

Use and Management**Cropland and pasture****General management considerations:**

- The soil is unsuited to cropland.

Management concerns: Wind erosion, the low available
 water capacity, a slow rate of water intake

Management measures:

- Proper grazing management helps to maintain plant vigor and conserve moisture.

Interpretive Groups

Land capability classification: VIs-5

Range site: Dense Clay

Windbreak suitability group: 10

Pasture suitability group: NS

BmA—Bullcreek-Slickspots complex, 0 to 4 percent slopes**Composition**

Bullcreek soil and similar inclusions: 50 to 60 percent

Slickspots and similar inclusions: 30 to 40 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landform: Fans and terraces

Landscape position: Bullcreek—foot slopes; Slickspots—
 microlows on foot slopes

Slope range: Bullcreek—0 to 4 percent; Slickspots—0 to
 2 percent

Shape of areas: Elongated or irregular

Size of areas: 10 to 200 acres

Typical Profile**Bullcreek****Surface layer:**

0 to 1 inch—grayish brown, calcareous clay

Subsoil:

1 to 10 inches—grayish brown, calcareous clay

10 to 19 inches—grayish brown, calcareous clay that
 has accumulations of salts

Underlying layer:

19 to 60 inches—grayish brown, calcareous clay

Slickspots

- Slickspots have a light gray, dispersed surface crust and dense, massive underlying material.
- Accumulations of visible salts are at or near the surface.
- Slickspots are barren or nearly barren of vegetation.

Soil Properties and Qualities

Drainage class: Bullcreek—well drained and moderately
 well drained; Slickspots—moderately well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60
 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Very slow

Available water capacity: Low

Organic matter content: Moderately low

Surface runoff: Bullcreek—medium; Slickspots—slow

Inclusions**Contrasting inclusions:**

- The sodium-affected Hurley soils on the lower foot slopes
- The poorly drained Lallie soils on low flood plains
- Promise soils, which do not have salts and are higher on the landscape than the Bullcreek soil

Use and Management**Cropland and pasture****General management considerations:**

- Areas of this map unit are unsuited to cropland.

Management concerns: Wind erosion, the low available
 water capacity, a slow rate of water intake, content
 of salts

Management measures:

- Proper grazing management helps to maintain plant vigor and conserve moisture.

Interpretive Groups

Land capability classification: Bullcreek—VIs-5;

Slickspots—VIIIs-3

Range site: Bullcreek—Dense Clay; Slickspots—none assigned

Windbreak suitability group: 10

Pasture suitability group: NS

BnA—Bullock fine sandy loam, 0 to 6 percent slopes***Composition***

Bullock soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Plains

Landscape position: The lower foot slopes and the upper toe slopes

Slope range: 0 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 300 acres

Typical Profile

Surface layer:

0 to 4 inches—grayish brown fine sandy loam

Subsoil:

4 to 10 inches—grayish brown sandy clay loam

10 to 15 inches—grayish brown, calcareous sandy loam that has accumulations of salts

Underlying layer:

15 to 23 inches—light brownish gray, calcareous clay loam that has accumulations of salts

23 to 60 inches—soft sandstone

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Moderately deep

Depth to a contrasting or impervious layer: 20 to 40 inches to soft sandstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Very slow

Available water capacity: Low

Organic matter content: Moderately low

Surface runoff: Medium

Inclusions

Contrasting inclusions:

- The sodium-affected Evridge and Parchin soils, which

do not have visible salts within a depth of 16 inches and are on back slopes and foot slopes

- Telfer, Vebar, and Zeona soils, which do not have a sodium-affected subsoil and are higher on the landscape than the Bullock soil

- Slickspots, which have salts at or near the surface and are in microlows on foot slopes

Similar inclusions:

- Soils that have more clay in the subsoil than the Bullock soil

Use and Management**Cropland and pasture**

General management considerations:

- The soil is unsuited to cropland.

Management concerns: Wind erosion, a sodium-affected subsoil and a content of salts that adversely affect crop growth by restricting root penetration, a slow rate of water intake

Management measures:

- Proper grazing management helps to maintain plant vigor and conserve moisture.

Interpretive Groups

Land capability classification: VIs-1

Range site: Thin Claypan

Windbreak suitability group: 10

Pasture suitability group: C

BrB—Bullock-Parchin fine sandy loams, 0 to 9 percent slopes***Composition***

Bullock soil and similar inclusions: 40 to 50 percent

Parchin soil and similar inclusions: 30 to 40 percent

Contrasting inclusions: 5 to 20 percent

Setting

Landform: Plains

Landscape position: Bullock—the lower foot slopes and the upper toe slopes; Parchin—back slopes and foot slopes

Slope range: Bullock—0 to 6 percent; Parchin—2 to 9 percent

Shape of areas: Irregular

Size of areas: 10 to 250 acres

Typical Profile**Bullock**

Surface layer:

0 to 4 inches—grayish brown fine sandy loam

Subsoil:

4 to 10 inches—grayish brown sandy clay loam

10 to 15 inches—grayish brown, calcareous sandy loam that has accumulations of salts

Underlying layer:

15 to 23 inches—light brownish gray, calcareous clay loam that has accumulations of salts

23 to 60 inches—soft sandstone

Parchin

Surface layer:

0 to 6 inches—grayish brown fine sandy loam

Subsurface layer:

6 to 10 inches—grayish brown fine sandy loam

Subsoil:

10 to 17 inches—brown sandy clay loam

17 to 24 inches—brown, calcareous fine sandy loam

Underlying layer:

24 to 29 inches—soft, weakly cemented sandstone that is stratified with lenses of loamy material

29 to 60 inches—soft, weakly cemented sandstone

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Moderately deep

Depth to a contrasting or impervious layer: 20 to 40 inches to soft sandstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Bullock—very slow; Parchin—slow

Available water capacity: Low

Organic matter content: Moderately low

Surface runoff: Medium

Inclusions

Contrasting inclusions:

- Evridge and Ekalaka soils, which have a dense, compact subsoil at a depth of 19 to 30 inches and are in landscape positions similar to those of the Parchin soil
- Parshall and Trembles soils, which do not have a sodium-affected subsoil and are lower on the landscape than the Bullock and Parchin soils
- Telfer and Vebar soils, which do not have a sodium-affected subsoil and are higher on the landscape than the Bullock and Parchin soils
- Slickspots, which have salts at or near the surface and are in microlows on foot slopes

Similar inclusions:

- Soils that have more clay in the subsoil than the Bullock and Parchin soils

Use and Management

Cropland and pasture

General management considerations:

- The Bullock soil is unsuited to cropland.

- Most of the acreage supports native grasses and is grazed.

Main crops: Wheat, oats, and alfalfa in areas of the Parchin soil

Management concerns: Wind erosion, water erosion, a sodium-affected subsoil that adversely affects crop growth by restricting root penetration, a slow rate of water intake, the low available water capacity

Management measures:

- Proper grazing management helps to maintain plant vigor, conserve moisture, and control erosion.

Interpretive Groups

Land capability classification: Bullock—VIs-1; Parchin—Ive-7

Range site: Bullock—Thin Claypan; Parchin—Claypan

Windbreak suitability group: Bullock—10; Parchin—9

Pasture suitability group: C

BsB—Bullock-Parchin-Slickspots complex, 0 to 9 percent slopes

Composition

Bullock soil and similar inclusions: 35 to 45 percent
 Parchin soil and similar inclusions: 30 to 40 percent
 Slickspots and similar inclusions: 15 to 30 percent
 Contrasting inclusions: 5 to 20 percent

Setting

Landform: Plains

Landscape position: Bullock—the lower foot slopes and the upper toe slopes; Parchin—back slopes and foot slopes; Slickspots—microlows on the lower foot slopes and toe slopes

Slope range: Bullock and Slickspots—0 to 6 percent; Parchin—2 to 9 percent

Shape of areas: Irregular

Size of areas: 10 to 250 acres

Typical Profile

Bullock

Surface layer:

0 to 4 inches—grayish brown fine sandy loam

Subsoil:

4 to 10 inches—grayish brown sandy clay loam

10 to 15 inches—grayish brown, calcareous sandy loam that has accumulations of salts

Underlying layer:

15 to 23 inches—light brownish gray, calcareous clay loam that has accumulations of salts

23 to 60 inches—soft sandstone

Parchin*Surface layer:*

0 to 6 inches—grayish brown fine sandy loam

Subsurface layer:

6 to 10 inches—grayish brown fine sandy loam

Subsoil:

10 to 17 inches—brown sandy clay loam

17 to 24 inches—brown, calcareous fine sandy loam

Underlying layer:

24 to 29 inches—soft, weakly cemented sandstone that is stratified with lenses of loamy material

29 to 60 inches—soft, weakly cemented sandstone

Slickspots

- Slickspots have a light gray, dispersed surface crust and dense, massive underlying material.
- Accumulations of visible salts are at or near the surface.
- Slickspots are barren or nearly barren of vegetation.

Soil Properties and Qualities

Drainage class: Bullock and Parchin—well drained;

Slickspots—moderately well drained

Depth to bedrock: Moderately deep

Depth to a contrasting or impervious layer: 20 to 40 inches to soft sandstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Bullock and Slickspots—very slow;

Parchin—slow

Available water capacity: Low

Organic matter content: Moderately low

Surface runoff: Bullock and Parchin—medium;

Slickspots—slow

Inclusions*Contrasting inclusions:*

- Evridge and Ekalaka soils, which have a dense, compact subsoil at a depth of 19 to 30 inches and are in landscape positions similar to those of the Parchin soil
- Parshall and Trembles soils, which do not have a sodium-affected subsoil and are lower on the landscape than the Bullock and Parchin soils
- Telfer and Vebar soils, which do not have a sodium-affected subsoil and are higher on the landscape than the Bullock and Parchin soils
- Rock outcrop on shoulders and back slopes

Similar inclusions:

- Soils that have more clay in the subsoil than the Bullock and Parchin soils

Use and Management**Cropland and pasture***General management considerations:*

- The Bullock soil and Slickspots are unsuited to cropland.
- Most of the acreage supports native grasses and is grazed.

Main crops: Wheat, oats, and alfalfa in areas of the Parchin soil

Management concerns: Bullock and Parchin—wind erosion, water erosion, a sodium-affected subsoil that adversely affects crop growth by restricting root penetration, a slow rate of water intake, the low available water capacity; Slickspots—content of salts

Management measures:

- Proper grazing management helps to maintain plant vigor, conserve moisture, and control erosion.

Interpretive Groups

Land capability classification: Bullock—VIs-1; Parchin—IVe-7; Slickspots—VIIIs-3

Range site: Bullock—Thin Claypan; Parchin—Claypan; Slickspots—none assigned

Windbreak suitability group: Bullock and Slickspots—10; Parchin—9

Pasture suitability group: Bullock and Parchin—C; Slickspots—NS

BuB—Bullock-Slickspots complex, 0 to 6 percent slopes**Composition**

Bullock soil and similar inclusions: 50 to 70 percent

Slickspots and similar inclusions: 30 to 50 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Plains

Landscape position: Bullock—the lower foot slopes and the upper toe slopes; Slickspots—microlows on the lower foot slopes and toe slopes

Slope range: 0 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 200 acres

Typical Profile**Bullock***Surface layer:*

0 to 4 inches—grayish brown fine sandy loam

Subsoil:

4 to 10 inches—grayish brown sandy clay loam

10 to 15 inches—grayish brown, calcareous sandy loam that has accumulations of salts

Underlying layer:

15 to 23 inches—light brownish gray, calcareous clay loam that has accumulations of salts

23 to 60 inches—soft sandstone

Slickspots

- Slickspots have a light gray, dispersed surface crust and dense, massive underlying material.
- Accumulations of visible salts are at or near the surface.
- Slickspots are barren or nearly barren of vegetation.

Soil Properties and Qualities

Drainage class: Bullock—well drained; Slickspots—moderately well drained

Depth to bedrock: Moderately deep

Depth to a contrasting or impervious layer: 20 to 40 inches to soft sandstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Very slow

Available water capacity: Low

Organic matter content: Moderately low

Surface runoff: Bullock—medium; Slickspots—slow

Inclusions

Contrasting inclusions:

- The sodium-affected Evridge and Parchin soils, which do not have visible salts within a depth of 16 inches and are on back slopes and foot slopes
- Telfer and Vebar soils, which do not have a sodium-affected subsoil and are higher on the landscape than the Bullock soil
- Areas of Rock outcrop, which include exposures of bedrock and are on steep shoulders and back slopes

Similar inclusions:

- Soils that have more clay in the subsoil than the Bullock soil

Use and Management

Cropland and pasture

General management considerations:

- Areas of this map unit are unsuited to cropland.

Management concerns: Wind erosion, a sodium-affected subsoil and a content of salts that adversely affect crop growth by restricting root penetration, a slow rate of water intake, the low available water capacity

Management measures:

- Proper grazing management helps to maintain plant vigor and conserve moisture.

Interpretive Groups

Land capability classification: Bullock—VIs-1;

Slickspots—VIIIs-3

Range site: Bullock—Thin Claypan; Slickspots—none assigned

Windbreak suitability group: 10

Pasture suitability group: Bullock—C; Slickspots—NS

BvE—Bullock-Slickspots-Rock outcrop complex, 0 to 40 percent slopes

Composition

Bullock soil and similar inclusions: 35 to 45 percent

Slickspots and similar inclusions: 30 to 40 percent

Rock outcrop and similar inclusions: 25 to 35 percent

Contrasting inclusions: 5 to 25 percent

Setting

Landform: Dissected plains

Landscape position: Bullock—foot slopes; Slickspots—microlows on foot slopes; Rock outcrop—back slopes and shoulders

Slope range: Bullock—0 to 25 percent; Slickspots—0 to 6 percent; Rock outcrop—0 to 40 percent

Shape of areas: Elongated or irregular

Size of areas: 10 to 250 acres

Typical Profile

Bullock

Surface layer:

0 to 4 inches—grayish brown fine sandy loam

Subsoil:

4 to 10 inches—grayish brown sandy clay loam

10 to 15 inches—grayish brown, calcareous sandy loam that has accumulations of salts

Underlying layer:

15 to 23 inches—light brownish gray, calcareous clay loam that has accumulations of salts

23 to 60 inches—soft sandstone

Slickspots

- Slickspots have a light gray, dispersed surface crust and dense, massive underlying material.
- Accumulations of visible salts are at or near the surface.
- Slickspots are barren or nearly barren of vegetation.

Rock outcrop

- Rock outcrop consists of eroding exposures of soft bedrock.
- Rock outcrop is barren of vegetation.

Soil Properties and Qualities

Drainage class: Bullock—well drained; Slickspots—moderately well drained

Depth to bedrock: Bullock and Slickspots—moderately deep

Depth to a contrasting or impervious layer: Bullock and Slickspots—20 to 40 inches to soft sandstone; Rock outcrop—soft bedrock at the surface

Depth to the seasonal high water table: More than 6 feet
Flooding: None

Permeability: Bullock and Slickspots—very slow

Available water capacity: Bullock and Slickspots—low

Organic matter content: Bullock and Slickspots—moderately low

Surface runoff: Bullock—medium; Slickspots—slow; Rock outcrop—very rapid

Inclusions

Contrasting inclusions:

- Cabba and Vebar soils, which do not have a sodium-affected subsoil and which occur as small isolated areas higher on the landscape than the Bullock soil
- The sodium-affected Evridge and Parchin soils, which do not have visible salts within a depth of 16 inches and are on back slopes and foot slopes
- Lallie and Trembles soils, which do not have a sodium-affected subsoil and are on flood plains along narrow drainage channels

Similar inclusions:

- Soils that have more clay in the subsoil than the Bullock soil
- Areas of Rock outcrop that have 1 to 5 inches of weathered material on the surface

Use and Management

Cropland and pasture

General management considerations:

- Areas of this map unit are unsuited to cropland.
- Most of the acreage supports native grasses and is grazed.
- Some areas provide habitat for wildlife.

Management concerns: Bullock and Slickspots—wind erosion, water erosion, a sodium-affected subsoil and a content of salts that adversely affect crop growth by restricting root penetration, a slow rate of water intake, the low available water capacity; Rock outcrop—exposed areas of bedrock

Management measures:

- Proper grazing management helps to maintain plant vigor, conserve moisture, and control erosion.

Interpretive Groups

Land capability classification: Bullock—VIs-1; Slickspots—VIIs-3; Rock outcrop—VIIs-1

Range site: Bullock—Thin Claypan; Slickspots and Rock outcrop—none assigned

Windbreak suitability group: 10

Pasture suitability group: Bullock—C; Slickspots and Rock outcrop—NS

BzB—Bullock-Telfer-Parchin complex, 0 to 9 percent slopes

Composition

Bullock soil and similar inclusions: 40 to 60 percent

Telfer soil and similar inclusions: 30 to 40 percent

Parchin soil and similar inclusions: 20 to 30 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Plains

Landscape position: Bullock—the lower foot slopes and the upper toe slopes; Telfer—shoulders and the upper back slopes; Parchin—the lower back slopes and foot slopes

Slope range: Bullock—0 to 6 percent; Telfer—0 to 9 percent; Parchin—2 to 6 percent

Shape of areas: Irregular

Size of areas: 20 to more than 150 acres

Typical Profile

Bullock

Surface layer:

0 to 4 inches—grayish brown fine sandy loam

Subsoil:

4 to 10 inches—grayish brown sandy clay loam

10 to 15 inches—grayish brown, calcareous sandy loam that has accumulations of salts

Underlying layer:

15 to 23 inches—light brownish gray, calcareous clay loam that has accumulations of salts

23 to 60 inches—soft sandstone

Telfer

Surface layer:

0 to 11 inches—dark grayish brown and dark brown loamy sand

Underlying layer:

11 to 60 inches—yellowish brown and light olive brown loamy sand

Parchin

Surface layer:

0 to 6 inches—grayish brown fine sandy loam

Subsurface layer:

6 to 10 inches—grayish brown fine sandy loam

Subsoil:

10 to 17 inches—brown sandy clay loam

17 to 24 inches—brown, calcareous fine sandy loam

Underlying layer:

24 to 29 inches—soft, weakly cemented sandstone that is stratified with lenses of loamy material

29 to 60 inches—soft, weakly cemented sandstone

Soil Properties and Qualities

Drainage class: Bullock and Parchin—well drained; Telfer—somewhat excessively drained

Depth to bedrock: Bullock and Parchin—moderately deep; Telfer—deep

Depth to a contrasting or impervious layer: Bullock and Parchin—20 to 40 inches to soft sandstone; Telfer—more than 60 inches

Depth to the seasonal high water table: More than 6 feet
Flooding: None

Permeability: Bullock—very slow; Telfer—rapid; Parchin—slow

Available water capacity: Low

Organic matter content: Bullock and Parchin—moderately low; Telfer—low

Surface runoff: Bullock and Parchin—medium; Telfer—slow

Inclusions**Contrasting inclusions:**

- The sodium-affected Evridge soils, which have a dense, compact subsoil at a depth of 20 to 30 inches and are in landscape positions similar to those of the Parchin soil
- Areas of Rock outcrop, which include exposures of bedrock and are on shoulders and back slopes
- Slickspots, which have salts at or near the surface and are in microlows on foot slopes

Similar inclusions:

- Soils that have more clay in the subsoil than the Bullock and Parchin soils
- Telfer soils that have soft sandstone at a depth of 40 to 60 inches

Use and Management**Cropland and pasture****General management considerations:**

- The Bullock soil is unsuited to cropland.
- Most of the acreage supports native grasses and is grazed.

Main crops: Wheat, oats, and alfalfa in areas of the Telfer and Parchin soils

Management concerns: Bullock and Parchin—wind erosion, the low available water capacity, a sodium-affected subsoil that adversely affects crop growth

by restricting root penetration, a slow rate of water intake; Telfer—wind erosion

Management measures:

- Proper grazing management helps to maintain plant vigor, conserve moisture, and control erosion.

Interpretive Groups

Land capability classification: Bullock—VIs-1; Telfer—IVe-9; Parchin—IVe-7

Range site: Bullock—Thin Claypan; Telfer—Sands; Parchin—Claypan

Windbreak suitability group: Bullock—10; Telfer—5; Parchin—9

Pasture suitability group: Bullock and Parchin—C; Telfer—H

CaF—Cabba-Amor loams, 15 to 60 percent slopes**Composition**

Cabba soil and similar inclusions: 55 to 70 percent

Amor soil and similar inclusions: 25 to 40 percent

Contrasting inclusions: 5 to 20 percent

Setting

Landform: Dissected plains

Landscape position: Cabba—shoulders and the upper back slopes; Amor—back slopes

Slope range: Cabba—15 to 60 percent; Amor—15 to 25 percent

Shape of areas: Irregular

Size of areas: 10 to 250 acres

Typical Profile**Cabba****Surface layer:**

0 to 4 inches—dark grayish brown loam

Underlying layer:

4 to 10 inches—grayish brown, calcareous loam

10 to 32 inches—grayish brown, weakly cemented sandstone

32 to 60 inches—soft siltstone

Amor**Surface layer:**

0 to 7 inches—dark grayish brown loam

Subsoil:

7 to 12 inches—grayish brown clay loam

12 to 21 inches—light brownish gray, calcareous clay loam

Underlying layer:

21 to 60 inches—stratified soft sandstone and siltstone

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Cabba—shallow; Amor—moderately deep

Depth to a contrasting or impervious layer: Cabba—10 to 20 inches to soft sandstone and siltstone; Amor—20 to 40 inches to soft sandstone and siltstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderate

Available water capacity: Cabba—very low; Amor—low

Organic matter content: Cabba—low; Amor—moderate

Surface runoff: Rapid

Inclusions

Contrasting inclusions:

- Flasher soils, which have less clay than the Cabba and Amor soils and are on shoulders
- Vebar soils, which have less clay than the Cabba and Amor soils and are on back slopes
- Regent soils, which have more clay than the Cabba and Amor soils and are on back slopes
- Wabek soils, which have sand and gravel at a depth of 7 to 14 inches and are on the shoulders of ridges and buttes
- Wayden soils, which have more clay than the Cabba and Amor soils and are on shoulders and the upper back slopes

Use and Management

Cropland and pasture

General management considerations:

- The soils are unsuited to cropland.
- This map unit includes small areas of exposed bedrock, landslides, vertical escarpments, and scattered surface stones.

Management concerns: Water erosion, the very low available water capacity in the Cabba soil, the low available water capacity in the Amor soil, the slope

Management measures:

- Proper grazing management helps to maintain plant vigor, conserve moisture, and control erosion.

Interpretive Groups

Land capability classification: VIIe-7

Range site: Cabba—Shallow; Amor—Silty

Windbreak suitability group: 10

Pasture suitability group: NS

CbD—Cabba-Reeder loams, 6 to 25 percent slopes

Composition

Cabba soil and similar inclusions: 50 to 65 percent

Reeder soil and similar inclusions: 25 to 35 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Dissected plains

Landscape position: Cabba—shoulders and the upper back slopes; Reeder—back slopes

Slope range: Cabba—6 to 25 percent; Reeder—6 to 9 percent

Shape of areas: Elongated or irregular

Size of areas: 10 to 1,000 acres

Typical Profile

Cabba

Surface layer:

0 to 4 inches—dark grayish brown loam

Underlying layer:

4 to 10 inches—grayish brown, calcareous loam

10 to 32 inches—grayish brown, weakly cemented sandstone

32 to 60 inches—soft siltstone

Reeder

Surface layer:

0 to 6 inches—dark grayish brown loam

Subsoil:

6 to 17 inches—dark brown and olive brown clay loam

17 to 34 inches—grayish brown, calcareous clay loam

Underlying layer:

34 to 60 inches—soft, weakly cemented sandstone

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Cabba—shallow; Reeder—moderately deep

Depth to a contrasting or impervious layer: Cabba—10 to 20 inches to soft sandstone and siltstone; Reeder—20 to 40 inches to soft sandstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderate

Available water capacity: Cabba—very low; Reeder—moderate

Organic matter content: Cabba—low; Reeder—moderate

Surface runoff: Medium

Inclusions

Contrasting inclusions:

- Cohagen and Vebar soils, which have less clay throughout than the Cabba and Reeder soils and are in similar landscape positions
- Opal, Regent, and Sansarc soils, which have more clay throughout than the Cabba and Reeder soils and are lower on the landscape
- Wayden soils, which have more clay throughout than

the Cabba and Reeder soils and are on the shoulders of ridges and knolls

Similar inclusions:

- Soils that have a surface layer that is thinner than that of the Cabba soil
- Soils that have less clay in the subsoil than the Reeder soil

Use and Management

Cropland and pasture

General management considerations:

- The Cabba soil is unsuited to cropland.
- The Reeder soil is unsuited to cropland except in the less sloping areas.
- This map unit includes some areas of entrenched drainageways and scattered surface stones.

Management concerns: Cabba—wind erosion, water erosion, the very low available water capacity; Reeder—water erosion, the low available water capacity

Management measures:

- Proper grazing management helps to maintain plant vigor, conserve moisture, and control erosion.

Interpretive Groups

Land capability classification: Cabba—Vle-11; Reeder—Ive-1

Range site: Cabba—Shallow; Reeder—Silty

Windbreak suitability group: Cabba—10; Reeder—6

Pasture suitability group: Cabba—NS; Reeder—F

CeE—Cabba-Shambo loams, 6 to 40 percent slopes

Composition

Cabba soil and similar inclusions: 50 to 60 percent
Shambo soil and similar inclusions: 25 to 35 percent
Contrasting inclusions: 5 to 25 percent

Setting

Landform: Dissected plains

Landscape position: Cabba—shoulders and the upper back slopes; Shambo—the lower back slopes and foot slopes

Slope range: Cabba—6 to 40 percent; Shambo—6 to 15 percent

Shape of areas: Narrow and elongated

Size of areas: 20 to 100 acres

Typical Profile

Cabba

Surface layer:

0 to 4 inches—dark grayish brown loam

Underlying layer:

4 to 10 inches—grayish brown, calcareous loam

10 to 32 inches—grayish brown, weakly cemented sandstone

32 to 60 inches—soft siltstone

Shambo

Surface layer:

0 to 7 inches—dark grayish brown loam

Subsoil:

7 to 18 inches—brown and olive brown loam

18 to 34 inches—grayish brown, calcareous loam

Underlying layer:

34 to 60 inches—grayish brown, calcareous loam that is stratified in the lower part

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Cabba—shallow; Shambo—deep

Depth to a contrasting or impervious layer: Cabba—10 to 20 inches to soft sandstone and siltstone; Shambo—more than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderate

Available water capacity: Cabba—very low; Shambo—high

Organic matter content: Cabba—low; Shambo—moderate

Surface runoff: Rapid

Inclusions

Contrasting inclusions:

- The sodium-affected Daglum and Rhoades soils on foot slopes and toe slopes
- Wabek soils, which have sand and gravel at a depth of 7 to 14 inches and are on shoulders
- Wayden soils, which have more clay throughout than the Cabba and Reeder soils and are on shoulders

Similar inclusions:

- Soils that have less clay than the Cabba soil
- Soils that have less clay in the subsoil than the Shambo soil

Use and Management

Cropland and pasture

General management considerations:

- The soils are unsuited to cropland.
- This map unit has some barren vertical escarpments.

Management concerns: Cabba—wind erosion, water erosion, the very low available water capacity, the slope; Shambo—water erosion, the slope

Management measures:

- Proper grazing management helps to maintain plant vigor, conserve moisture, and control erosion.

Interpretive Groups

Land capability classification: Vle-11

Range site: Cabba—Shallow; Shambo—Silty

Windbreak suitability group: 10

Pasture suitability group: NS

CgF—Cohagen-Cabba-Rock outcrop complex, 6 to 70 percent slopes

Composition

Cohagen soil and similar inclusions: 40 to 60 percent

Cabba soil and similar inclusions: 30 to 40 percent

Rock outcrop and similar inclusions: 20 to 35 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Dissected plains

Landscape position: Cohagen—shoulders and the upper back slopes; Cabba—back slopes; Rock outcrop—shoulders and back slopes

Slope range: Cohagen and Cabba—6 to 40 percent;

Rock outcrop—6 to 70 percent

Shape of areas: Narrow and elongated

Size of areas: 10 to 300 acres

Typical Profile

Cohagen

Surface layer:

0 to 5 inches—dark brown fine sandy loam

Underlying layer:

5 to 16 inches—dark yellowish brown fine sandy loam

16 to 60 inches—soft, weakly cemented sandstone

Cabba

Surface layer:

0 to 4 inches—dark grayish brown loam

Underlying layer:

4 to 10 inches—grayish brown, calcareous loam

10 to 32 inches—grayish brown, weakly cemented sandstone

32 to 60 inches—soft siltstone

Rock outcrop

- Rock outcrop consists of eroding exposures of soft bedrock.

- Rock outcrop is barren of vegetation.

Soil Properties and Qualities

Drainage class: Cohagen and Cabba—well drained

Depth to bedrock: Cohagen and Cabba—shallow

Depth to a contrasting or impervious layer: Cohagen—10 to 20 inches to soft sandstone; Cabba—10 to 20

inches to soft sandstone and siltstone; Rock

outcrop—soft bedrock at the surface

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Cohagen—moderately rapid; Cabba—moderate

Available water capacity: Cohagen and Cabba—very low

Organic matter content: Cohagen and Cabba—low

Surface runoff: Cohagen and Cabba—rapid; Rock outcrop—very rapid

Inclusions

Contrasting inclusions:

- Amor and Telfer soils, which are deeper to bedrock than the Cohagen and Cabba soils and are on shoulders and the upper back slopes

- Wabek soils, which have sand and gravel at a depth of 7 to 14 inches and are on shoulders

- Wayden soils, which have more clay throughout than the Cohagen and Cabba soils and are on shoulders

Similar inclusions:

- Cohagen soils that have sandstone at a depth of less than 10 inches

Use and Management

Cropland and pasture

General management considerations:

- Areas of this map unit are unsuited to cropland.

Management concerns: Cohagen and Cabba—water erosion, the very low available water capacity, the slope; Rock outcrop—exposed areas of soft bedrock

Management measures:

- Proper grazing management helps to maintain plant vigor, conserve moisture, and control erosion.

Interpretive Groups

Land capability classification: Cohagen—VIIe-4;

Cabba—VIIe-7; Rock outcrop—VIIIs-1

Range site: Cohagen and Cabba—Shallow; Rock outcrop—none assigned

Windbreak suitability group: 10

Pasture suitability group: NS

CvD—Cohagen-Vebar fine sandy loams, 6 to 25 percent slopes

Composition

Cohagen soil and similar inclusions: 55 to 70 percent

Vebar soil and similar inclusions: 30 to 40 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Dissected plains

Landscape position: Cohagen—shoulders and the upper back slopes; Vebar—back slopes

Slope range: Cohagen—6 to 25 percent; Vebar—6 to 15 percent

Shape of areas: Irregular

Size of areas: 10 to 300 acres

Typical Profile

Cohagen

Surface layer:

0 to 5 inches—dark brown fine sandy loam

Underlying layer:

5 to 16 inches—dark yellowish brown fine sandy loam

16 to 60 inches—soft, weakly cemented sandstone

Vebar

Surface layer:

0 to 7 inches—very dark grayish brown fine sandy loam

Subsoil:

7 to 13 inches—dark brown fine sandy loam

13 to 23 inches—dark yellowish brown fine sandy loam

Underlying layer:

23 to 30 inches—yellowish brown fine sandy loam

30 to 60 inches—soft, weakly cemented sandstone

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Cohagen—shallow; Vebar—moderately deep

Depth to a contrasting or impervious layer: Cohagen—10 to 20 inches to soft sandstone; Vebar—20 to 40 inches to soft sandstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderately rapid

Available water capacity: Cohagen—very low; Vebar—low

Organic matter content: Cohagen—low; Vebar—moderate

Surface runoff: Rapid

Inclusions

Contrasting inclusions:

- Cabba soils, which have more clay throughout than the Cohagen and Vebar soils and are on shoulders and the upper back slopes
- The sodium-affected Daglum soils on foot slopes
- Parshall soils, which are dark to a depth of more than 16 inches and are on foot slopes
- Reeder soils, which have more clay in the subsoil than the Cohagen and Vebar soils and are on back slopes

Similar inclusions:

- Soils that have more clay in the subsoil than the Vebar soil

- Vebar soils that have sandstone at a depth of more than 40 inches
- Cohagen soils that have sandstone at a depth of less than 10 inches

Use and Management

Cropland and pasture

General management considerations:

- The Cohagen soil is unsuited to cropland.
- The Vebar soil is unsuited to cropland except in the less sloping areas.

Management concerns: Wind erosion, water erosion, the very low available water capacity in the Cohagen soil, the low available water capacity in the Vebar soil

Management measures:

- Proper grazing management helps to maintain plant vigor, conserve moisture, and control erosion.

Interpretive Groups

Land capability classification: Cohagen—Vle-10; Vebar—IVe-8

Range site: Cohagen—Shallow; Vebar—Sandy

Windbreak suitability group: Cohagen—10; Vebar—6

Pasture suitability group: Cohagen—NS; Vebar—H

DaA—Daglum loam, 0 to 3 percent slopes

Composition

Daglum soil and similar inclusions: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Plains

Landscape position: Foot slopes

Slope range: 0 to 3 percent

Shape of areas: Elongated or irregular

Size of areas: 10 to 100 acres

Typical Profile

Surface layer:

0 to 5 inches—dark grayish brown loam

Subsurface layer:

5 to 7 inches—light brownish gray loam

Subsoil:

7 to 16 inches—dark grayish brown clay

16 to 25 inches—grayish brown, calcareous clay that has accumulations of salts

Underlying layer:

25 to 36 inches—grayish brown, calcareous clay loam that has accumulations of salts

36 to 60 inches—light olive brown, calcareous clay loam

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: 40 to more than 60 inches to shale

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Very slow

Available water capacity: Moderate

Organic matter content: Moderate

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- Belfield soils, which do not have columnar structure in the subsoil and are on the lower back slopes and foot slopes
- Grail soils, which do not have a sodium-affected subsoil and are on foot slopes
- Reeder and Regent soils, which do not have a sodium-affected subsoil and are on back slopes
- Rhoades soils, which have a surface layer that is thinner than that of the Daglum soil, have visible salts closer to surface, and are on the lower back slopes and foot slopes
- Slickspots, which have salts at or near the surface and are in microlows on foot slopes

Similar inclusions:

- Soils that have less clay in the subsoil than the Daglum soil
- Soils that have bedrock at a depth of more than 30 inches

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: A sodium-affected subsoil that adversely affects crop growth by restricting root penetration, a slow rate of water intake

Management measures:

- Minimizing tillage, leaving crop residue on the surface, and including grasses and legumes in the cropping system help to conserve moisture and maintain the content of organic matter.
- Chiseling and subsoiling improve tilth and increase the rate of water intake.

Interpretive Groups

Land capability classification: IVs-2

Range site: Claypan

Windbreak suitability group: 9

Pasture suitability group: C

DuD—Dupree-Rock outcrop complex, 6 to 30 percent slopes

Composition

Dupree soil and similar inclusions: 55 to 75 percent

Rock outcrop and similar inclusions: 20 to 40 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Dissected plains

Landscape position: Dupree—the lower back slopes and foot slopes; Rock outcrop—back slopes

Slope range: 6 to 30 percent

Shape of areas: Irregular

Size of areas: 10 to 1,000 acres

Typical Profile

Dupree

Surface layer:

0 to 3 inches—gray clay

Subsoil:

3 to 15 inches—gray and grayish brown clay

Underlying layer:

15 to 60 inches—bedded shale

Rock outcrop

- Rock outcrop consists of eroding exposures of soft bedrock.
- Rock outcrop is barren of vegetation.

Soil Properties and Qualities

Drainage class: Dupree—well drained

Depth to bedrock: Dupree—shallow

Depth to a contrasting or impervious layer: Dupree—10 to 20 inches to shale; Rock outcrop—soft bedrock at the surface

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Dupree—very slow

Available water capacity: Dupree—very low

Organic matter content: Dupree—moderately low

Surface runoff: Dupree—medium; Rock outcrop—rapid

Inclusions

Contrasting inclusions:

- Bullcreek soils, which have shale below a depth of 20 inches and are on foot slopes
- Opal soils, which have shale below a depth of 20 inches and are on back slopes
- The sodium-affected Hurley soils on the lower foot slopes and toe slopes
- The poorly drained, saline Lallie soils on low flood plains
- Slickspots, which have salts at or near the surface and are in microlows on foot slopes

Similar inclusions:

- Soils that have less clay in the subsoil than the Dupree soil

Use and Management**Cropland and pasture***General management considerations:*

- Areas of this map unit are unsuited to cropland.
- The slopes are dissected by many small drainageways with gullies.

Management concerns: Dupree—wind erosion, water erosion, the very low available water capacity, a slow rate of water intake, the slope; Rock outcrop—exposed areas of barren bedrock

Management measures:

- Proper grazing management helps to maintain plant vigor, conserve moisture, and control erosion.

Interpretive Groups

Land capability classification: Dupree—Vle-12; Rock outcrop—VIII-1

Range site: Dupree—Dense Clay; Rock outcrop—none assigned

Windbreak suitability group: Dupree—10; Rock outcrop—none assigned

Pasture suitability group: NS

EKA—Ekalaka very fine sandy loam, 0 to 6 percent slopes***Composition***

Ekalaka soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Plains

Landscape position: Foot slopes

Slope range: 0 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 100 acres

Typical Profile*Surface layer:*

0 to 13 inches—dark grayish brown very fine sandy loam

Subsurface layer:

13 to 19 inches—grayish brown very fine sandy loam

Subsoil:

19 to 26 inches—light olive brown fine sandy loam

26 to 45 inches—light olive brown, calcareous fine sandy loam that has accumulations of salts

Underlying layer:

45 to 60 inches—soft, weakly cemented sandstone

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: 40 to more than 60 inches to soft sandstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Slow

Available water capacity: Moderate

Organic matter content: Moderate

Surface runoff: Slow or medium

Inclusions*Contrasting inclusions:*

- Daglum and Rhoades soils, which have more clay in the subsoil than the Ekalaka soil and are on foot slopes and toe slopes
- The poorly drained Glenross soils on toe slopes
- Parshall soils, which do not have a sodium-affected subsoil, are dark to a depth of more than 16 inches, and are on foot slopes
- Vebar soils, which do not have a sodium-affected subsoil and are on back slopes

Similar inclusions:

- Soils that have a surface layer that is thicker than that of the Ekalaka soil

Use and Management**Cropland and pasture**

Main crops: Wheat, oats, and alfalfa

Management concerns: Wind erosion, a sodium-affected subsoil that adversely affects crop growth by restricting root penetration, a slow rate of water intake

Management measures:

- Minimizing tillage, leaving crop residue on the surface, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain the content of organic matter.
- Chiseling and subsoiling improve tilth and increase the rate of water intake.

Interpretive Groups

Land capability classification: IVE-13

Range site: Sandy

Windbreak suitability group: 5

Pasture suitability group: H

EpB—Ekalaka-Parshall complex, 0 to 6 percent slopes***Composition***

Ekalaka soil and similar inclusions: 45 to 65 percent

Parshall soil and similar inclusions: 25 to 35 percent
 Contrasting inclusions: 5 to 15 percent

Setting

Landform: Plains

Landscape position: Foot slopes

Slope range: 0 to 6 percent

Shape of areas: Irregular

Size of areas: 30 to 100 acres

Typical Profile

Ekalaka

Surface layer:

0 to 13 inches—dark grayish brown very fine sandy loam

Subsurface layer:

13 to 19 inches—grayish brown very fine sandy loam

Subsoil:

19 to 26 inches—light olive brown fine sandy loam

26 to 45 inches—light olive brown, calcareous fine sandy loam that has accumulations of salts

Underlying layer:

45 to 60 inches—soft, weakly cemented sandstone

Parshall

Surface layer:

0 to 7 inches—very dark grayish brown fine sandy loam

Subsurface layer:

7 to 11 inches—very dark grayish brown fine sandy loam

Subsoil:

11 to 30 inches—dark brown fine sandy loam

Underlying layer:

30 to 60 inches—dark yellowish brown and light olive brown fine sandy loam

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: Ekalaka—40 to more than 60 inches to soft sandstone;

Parshall—more than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Ekalaka—slow; Parshall—moderately rapid

Available water capacity: Moderate

Organic matter content: Moderate

Surface runoff: Ekalaka—slow or medium; Parshall—slow

Inclusions

Contrasting inclusions:

- Daglum and Rhoades soils, which have more clay in

the subsoil than the Ekalaka and Parshall soils and are on foot slopes and toe slopes

- The poorly drained Glenross soils on toe slopes
- Vebar soils, which do not have a sodium-affected subsoil, have bedrock at a depth of 20 to 40 inches, and are on back slopes
- Slickspots, which have salts at or near the surface and are in microlows on foot slopes

Similar inclusions:

- Soils that have a surface layer that is thicker than that of the Ekalaka soil
- Ekalaka soils that have bedrock within a depth of 40 inches
- Soils that have more clay in the subsoil than the Parshall soil

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Wind erosion, a sodium-affected subsoil in the Ekalaka soil that adversely affects crop growth by restricting root penetration, a slow rate of water intake

Management measures:

- Minimizing tillage, leaving crop residue on the surface, stripcropping, establishing field windbreaks, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain the content of organic matter.
- Chiseling and subsoiling improve tilth and increase the rate of water intake.

Interpretive Groups

Land capability classification: Ekalaka—IVe-13;

Parshall—IIIe-7

Range site: Sandy

Windbreak suitability group: Ekalaka—5; Parshall—1

Pasture suitability group: H

EvB—Evridge fine sandy loam, 0 to 6 percent slopes

Composition

Evridge soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Plains

Landscape position: Back slopes and foot slopes

Slope range: 0 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 150 acres

Typical Profile

Surface layer:

0 to 18 inches—dark grayish brown fine sandy loam and loamy fine sand in the lower part

Subsurface layer:

18 to 23 inches—grayish brown loamy fine sand

Subsoil:

23 to 28 inches—grayish brown fine sandy loam

28 to 38 inches—light olive gray, calcareous fine sandy loam

Underlying layer:

38 to 60 inches—soft, weakly cemented sandstone

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Moderately deep

Depth to a contrasting or impervious layer: 20 to 40 inches to soft sandstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderately rapid in the upper part and slow in the subsoil and underlying material

Available water capacity: Low

Organic matter content: Moderately low

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- Bullock and Parchin soils, which have more clay in the subsoil than the Evridge soil and are on foot slopes and the upper toe slopes
- Telfer soils, which do not have a sodium-affected subsoil and are on shoulders

Similar inclusions:

- Soils that have more clay in the subsoil than the Evridge soil
- Soils that have a surface layer that is thinner than that of the Evridge soil
- Soils that have bedrock below a depth of 40 inches

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Wind erosion, a sodium-affected subsoil that adversely affects crop growth by restricting root penetration, a slow rate of water intake

Management measures:

- Minimizing tillage, leaving crop residue on the surface, stripcropping, establishing field windbreaks, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain the content of organic matter.

- Chiseling and subsoiling improve tilth and increase the rate of water intake.

Interpretive Groups

Land capability classification: IVE-13

Range site: Sandy

Windbreak suitability group: 5

Pasture suitability group: H

EwB—Evridge-Bullock fine sandy loams, 0 to 6 percent slopes

Composition

Evridge soil and similar inclusions: 40 to 60 percent

Bullock soil and similar inclusions: 35 to 50 percent

Contrasting inclusions: 5 to 20 percent

Setting

Landform: Plains

Landscape position: Evridge—back slopes and foot slopes; Bullock—the lower foot slopes and the upper toe slopes

Slope range: Evridge—2 to 6 percent; Bullock—0 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 100 acres

Typical Profile

Evridge

Surface layer:

0 to 18 inches—dark grayish brown fine sandy loam and loamy fine sand in the lower part

Subsurface layer:

18 to 23 inches—grayish brown loamy fine sand

Subsoil:

23 to 28 inches—grayish brown fine sandy loam

28 to 38 inches—light olive gray, calcareous fine sandy loam

Underlying layer:

38 to 60 inches—soft, weakly cemented sandstone

Bullock

Surface layer:

0 to 4 inches—grayish brown fine sandy loam

Subsoil:

4 to 10 inches—grayish brown sandy clay loam

10 to 15 inches—grayish brown, calcareous sandy loam that has accumulations of salts

Underlying layer:

15 to 23 inches—light brownish gray, calcareous clay loam that has accumulations of salts

23 to 60 inches—soft sandstone

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Moderately deep

Depth to a contrasting or impervious layer: 20 to 40 inches to soft sandstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Evridge—moderately rapid in the upper part and slow in the subsoil and underlying material; Bullock—very slow

Available water capacity: Low

Organic matter content: Moderately low

Surface runoff: Medium

Inclusions

Contrasting inclusions:

- Daglum soils, which have more clay in the subsoil than the Evridge and Bullock soils and are on foot slopes
- Telfer and Zeona soils, which do not have a sodium-affected subsoil and are on shoulders and back slopes

Similar inclusions:

- Soils that have a surface layer that is thinner than that of the Evridge soil
- Evridge soils that have bedrock at depth of more than 40 inches
- Soils that have a surface layer that is thicker than that of the Bullock soil
- Soils that have more clay in the subsoil than the Bullock soil

Use and Management

Cropland and pasture

General management considerations:

- The Bullock soil is unsuited to cropland.
- Most of the acreage supports native grasses and is grazed.

Main crops: Wheat, oats, and alfalfa in areas of the Evridge soil

Management concerns: Wind erosion, a sodium-affected subsoil that adversely affects crop growth by restricting root penetration, a slow rate of water intake

Management measures:

- Minimizing tillage, leaving crop residue on the surface, stripcropping, establishing field windbreaks, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain the content of organic matter.
- Chiseling and subsoiling improve tilth and increase the rate of water intake.

Interpretive Groups

Land capability classification: Evridge—IVe-13; Bullock—VIs-1

Range site: Evridge—Sandy; Bullock—Thin Claypan

Windbreak suitability group: Evridge—5; Bullock—10

Pasture suitability group: Evridge—H; Bullock—C

ExB—Evridge-Parchin fine sandy loams, 0 to 6 percent slopes

Composition

Evridge soil and similar inclusions: 40 to 60 percent

Parchin soil and similar inclusions: 20 to 40 percent

Contrasting inclusions: 5 to 25 percent

Setting

Landform: Plains

Landscape position: Back slopes and foot slopes

Slope range: 0 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 300 acres

Typical Profile

Evridge

Surface layer:

0 to 7 inches—dark grayish brown fine sandy loam

7 to 18 inches—dark grayish brown loamy fine sand

Subsurface layer:

18 to 23 inches—grayish brown loamy fine sand

Subsoil:

23 to 28 inches—grayish brown fine sandy loam

28 to 38 inches—light olive gray, calcareous fine sandy loam

Underlying layer:

38 to 60 inches—soft, weakly cemented sandstone

Parchin

Surface layer:

0 to 6 inches—grayish brown fine sandy loam

Subsurface layer:

6 to 10 inches—grayish brown fine sandy loam

Subsoil:

10 to 17 inches—brown sandy clay loam

17 to 24 inches—brown, calcareous fine sandy loam

Underlying layer:

24 to 29 inches—soft, weakly cemented sandstone that is stratified with lenses of loamy material

29 to 60 inches—soft, weakly cemented sandstone

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Moderately deep

Depth to a contrasting or impervious layer: 20 to 40 inches to soft sandstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Evridge—moderately rapid in the upper part and slow in the subsoil and underlying material; Parchin—slow

Available water capacity: Low

Organic matter content: Moderately low

Surface runoff: Medium

Inclusions

Contrasting inclusions:

- Bullock and Rhoades soils, which have visible salts within a depth of 16 inches and are on the lower foot slopes and the upper toe slopes
- Telfer and Zeona soils, which do not have a sodium-affected subsoil and are on shoulders and back slopes

Similar inclusions:

- Soils that have a surface layer that is thinner than that of the Evridge and Parchin soils
- Evridge soils that have bedrock at a depth of more than 40 inches
- Soils that have more clay in the subsoil than the Parchin soil

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Wind erosion, a sodium-affected subsoil that adversely affects crop growth by restricting root penetration, a slow rate of water intake

Management measures:

- Minimizing tillage, leaving crop residue on the surface, stripcropping, establishing field windbreaks, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain the content of organic matter.
- Chiseling and subsoiling improve tilth and increase the rate of water intake.

Interpretive Groups

Land capability classification: Evridge—Ive-13; Parchin—Ive-7

Range site: Evridge—Sandy; Parchin—Claypan

Windbreak suitability group: Evridge—5; Parchin—9

Pasture suitability group: Evridge—H; Parchin—C

FaA—Farnuf loam, 0 to 2 percent slopes

Composition

Farnuf soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Terraces

Landscape position: The lower back slopes and foot slopes

Slope range: 0 to 2 percent

Shape of areas: Irregular

Size of areas: 10 to 200 acres

Typical Profile

Surface layer:

0 to 5 inches—dark grayish brown loam

Subsoil:

5 to 14 inches—dark brown clay loam

14 to 41 inches—light brownish gray, calcareous clay loam and loam

Underlying layer:

41 to 60 inches—grayish brown, calcareous loam

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderate

Available water capacity: High

Organic matter content: Moderate

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- Arnegard and Grail soils, which are dark to a depth of more than 16 inches and are on foot slopes
- The sodium-affected Daglum and Rhoades soils on foot slopes and toe slopes
- Savage soils, which have more clay in the subsoil than the Farnuf soil and are on foot slopes

Similar inclusions:

- Soils that have less clay in the subsoil than the Farnuf soil
- Soils that have sand and gravel within a depth 40 inches
- Soils that have as much as 15 percent cobble fragments in the upper 30 inches and as much as 35 percent cobble fragments at a depth of 30 to 40 inches

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Lack of moisture for long-season crops

Management measures:

- Minimizing tillage and leaving crop residue on the surface help to conserve moisture and maintain tilth and the content of organic matter.

Interpretive Groups

Land capability classification: Ilc-2

Range site: Silty

Windbreak suitability group: 3

Pasture suitability group: F

FaB—Farnuf loam, 2 to 6 percent slopes

Composition

Farnuf soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Terraces

Landscape position: The lower back slopes and foot slopes

Slope range: 2 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 250 acres

Typical Profile

Surface layer:

0 to 5 inches—dark grayish brown loam

Subsoil:

5 to 14 inches—dark brown clay loam

14 to 41 inches—light brownish gray, calcareous clay loam and loam

Underlying layer:

41 to 60 inches—grayish brown, calcareous loam

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderate

Available water capacity: High

Organic matter content: Moderate

Surface runoff: Medium

Inclusions

Contrasting inclusions:

- Arnegard and Grail soils, which are dark to a depth of more than 16 inches and are on foot slopes
- The sodium-affected Daglum and Rhoades soils on foot slopes and toe slopes
- Savage soils, which have more clay in the subsoil than the Farnuf soil and are on foot slopes

Similar inclusions:

- Soils that have less clay in the subsoil than the Farnuf soil

- Soils that have sand and gravel within a depth of 40 inches
- Soils that have as much as 15 percent cobble fragments in the upper 30 inches and as much as 35 percent cobble fragments at a depth of 30 to 40 inches

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Water erosion

Management measures:

- Minimizing tillage and leaving crop residue on the surface help to conserve moisture, control erosion, and maintain tilth and the content of organic matter.
- Contour farming and grassed waterways help to control water erosion.

Interpretive Groups

Land capability classification: Ilc-1

Range site: Silty

Windbreak suitability group: 3

Pasture suitability group: F

FrF—Flasher-Rock outcrop complex, 30 to 60 percent slopes

Composition

Flasher soil and similar inclusions: 50 to 70 percent

Rock outcrop and similar inclusions: 20 to 40 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Dissected plains

Landscape position: Flasher—summits, shoulders, and the upper back slopes; Rock outcrop—summits and shoulders

Slope range: 30 to 60 percent

Shape of areas: Elongated

Size of areas: 20 to 250 acres

Typical Profile

Flasher

Surface layer:

0 to 4 inches—dark grayish brown fine sandy loam

Underlying layer:

4 to 9 inches—olive gray loamy fine sand

9 to 60 inches—soft, weakly cemented sandstone

Rock outcrop

- Rock outcrop consists of eroding exposures of soft bedrock.
- Rock outcrop is barren of vegetation.

Soil Properties and Qualities

Drainage class: Flasher—somewhat excessively drained

Depth to bedrock: Flasher—shallow

Depth to a contrasting or impervious layer: Flasher—7 to 20 inches to soft sandstone; Rock outcrop—soft bedrock at the surface

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Flasher—rapid

Available water capacity: Flasher—very low

Organic matter content: Flasher—moderately low

Surface runoff: Flasher—rapid; Rock outcrop—very rapid

Inclusions

Contrasting inclusions:

- Telfer soils, which have sandstone at a depth of more than 40 inches and are on back slopes

Similar inclusions:

- Flasher soils that have soft sandstone at a depth of less than 10 inches

Use and Management

Cropland and pasture

General management considerations:

- Areas of this map unit are unsuited to cropland.

Management concerns: Flasher—wind erosion, the very low available water capacity, the slope; Rock outcrop—exposed areas of hard sandstone

Management measures:

- Proper grazing management helps to maintain plant vigor, conserve moisture, and control erosion.

Interpretive Groups

Land capability classification: Flasher—Vllc-4; Rock outcrop—Vllls-1

Range site: Flasher—Shallow; Rock outcrop—none assigned

Windbreak suitability group: 10

Pasture suitability group: NS

FtF—Flasher-Telfer complex, 15 to 40 percent slopes

Composition

Flasher soil and similar inclusions: 40 to 60 percent

Telfer soil and similar inclusions: 25 to 40 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Dissected plains

Landscape position: Flasher—summits and shoulders; Telfer—back slopes

Slope range: Flasher—15 to 40 percent; Telfer—15 to 25 percent

Shape of areas: Elongated or irregular

Size of areas: 50 to 1,000 acres

Typical Profile

Flasher

Surface layer:

0 to 4 inches—dark grayish brown fine sandy loam

Underlying layer:

4 to 9 inches—olive gray loamy fine sand

9 to 60 inches—soft, weakly cemented sandstone

Telfer

Surface layer:

0 to 11 inches—dark grayish brown and dark brown loamy sand

Underlying layer:

11 to 60 inches—yellowish brown and light olive brown loamy sand

Soil Properties and Qualities

Drainage class: Somewhat excessively drained

Depth to bedrock: Flasher—shallow; Telfer—deep

Depth to a contrasting or impervious layer: Flasher—7 to 20 inches to soft sandstone; Telfer—more than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Rapid

Available water capacity: Flasher—very low; Telfer—low

Organic matter content: Flasher—moderately low; Telfer—low

Surface runoff: Slow or medium

Inclusions

Contrasting inclusions:

- Cabba, Parshall, Vebar, and Wayden soils, which have more clay than the Flasher and Telfer soils and are lower on the landscape
- Wabek soils, which have sand and gravel at a depth of 7 to 14 inches and are on shoulders
- Areas of Rock outcrop, which include exposed ledges of hard sandstone and are higher on the landscape than the Flasher and Telfer soils

Similar inclusions:

- Flasher soils that have soft sandstone at a depth of less than 10 inches
- Telfer soils that have soft sandstone at a depth of 40 to 60 inches

Use and Management

Cropland and pasture

General management considerations:

- The soils are unsuited to cropland.

Management concerns: Wind erosion, the very low available water capacity in the Flasher soil, the low available water capacity in the Telfer soil, the slope

Management measures:

- Proper grazing management helps to maintain plant vigor, conserve moisture, and control erosion.

Interpretive Groups

Land capability classification: Flasher—Vlle-4; Telfer—Vle-7

Range site: Flasher—Shallow; Telfer—Sands

Windbreak suitability group: 10

Pasture suitability group: NS

Ge—Glenross fine sandy loam

Composition

Glenross soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Flood plains

Landscape position: Toe slopes

Slope range: 0 to 1 percent

Shape of areas: Irregular

Size of areas: 10 to 50 acres

Typical Profile

Surface layer:

0 to 1 inch—light brownish gray fine sandy loam

Subsoil:

1 to 6 inches—grayish brown, mottled, calcareous sandy clay loam

6 to 15 inches—olive, mottled, calcareous sandy clay loam that has accumulations of salts

Underlying layer:

15 to 37 inches—pale olive, mottled, calcareous sandy clay loam that has accumulations of salts

37 to 60 inches—light olive gray, mottled, calcareous fine sandy loam

Soil Properties and Qualities

Drainage class: Poorly drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: 0 to 1 foot

Flooding: Frequency—occasional; duration—very brief

Permeability: Slow

Available water capacity: Moderate

Organic matter content: Moderate

Surface runoff: Very slow

Inclusions

Contrasting inclusions:

- The well drained Ekalaka soils that are higher on the landscape than the Glenross soil
- Lallie soils, which have more clay than the Glenross soil and are lower on the landscape

Similar inclusions:

- Soils that have more clay in the subsoil than the Glenross soil
- Soils that are ponded to a depth of 2 feet during part of the year

Use and Management

Cropland and pasture

General management considerations:

- The soil is unsuited to cropland.

Management concerns: Wetness, a high concentration of salts

Management measures:

- Proper grazing management helps to maintain plant vigor.

Interpretive Groups

Land capability classification: Vlw-4

Range site: Saline Lowland

Windbreak suitability group: 10

Pasture suitability group: NS

Gk—Glenross-Ekalaka fine sandy loams

Composition

Glenross soil and similar inclusions: 50 to 60 percent

Ekalaka soil and similar inclusions: 35 to 40 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Plains

Landscape position: Glenross—toe slopes; Ekalaka—foot slopes

Slope range: Glenross—0 to 1 percent; Ekalaka—0 to 3 percent

Shape of areas: Long and narrow or irregular

Size of areas: 10 to 100 acres

Typical Profile

Glenross

Surface layer:

0 to 1 inch—light brownish gray fine sandy loam

Subsoil:

1 to 6 inches—grayish brown, mottled, calcareous sandy clay loam

6 to 15 inches—olive, mottled, calcareous sandy clay loam that has accumulations of salts

Underlying layer:

15 to 37 inches—pale olive, mottled, calcareous sandy clay loam that has accumulations of salts

37 to 60 inches—light olive gray, mottled, calcareous fine sandy loam

Ekalaka*Surface layer:*

0 to 13 inches—dark grayish brown very fine sandy loam

Subsurface layer:

13 to 19 inches—grayish brown very fine sandy loam

Subsoil:

19 to 26 inches—light olive brown fine sandy loam

26 to 45 inches—light olive brown, calcareous fine sandy loam that has accumulations of salts

Underlying layer:

45 to 60 inches—soft, weakly cemented sandstone

Soil Properties and Qualities

Drainage class: Glenross—poorly drained; Ekalaka—well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: Glenross—more than 60 inches; Ekalaka—40 to more than 60 inches to soft sandstone

Depth to the seasonal high water table: Glenross—0 to 1 foot; Ekalaka—more than 6 feet

Flooding in areas of the Glenross soil: Frequency—occasional; duration—very brief

Flooding in areas of the Ekalaka soil: None

Permeability: Slow

Available water capacity: Moderate

Organic matter content: Moderate

Surface runoff: Glenross—very slow; Ekalaka—medium

Inclusions*Contrasting inclusions:*

- Parshall and Vebar soils, which do not have a sodium-affected subsoil and are higher on the landscape than the Glenross and Ekalaka soils

Similar inclusions:

- Soils that have more clay in the subsoil than the Glenross and Ekalaka soils

Use and Management**Cropland and pasture***General management considerations:*

- The soils are unsuited to cropland.

Management concerns: Glenross—wetness, a high concentration of salts; Ekalaka—a sodium-affected subsoil that adversely affects crop growth by restricting root penetration, a slow rate of water intake

Management measures:

- Proper grazing management helps to maintain plant vigor.

Interpretive Groups

Land capability classification: Glenross—Vlw-4;

Ekalaka—IVe-13

Range site: Glenross—Saline Lowland; Ekalaka—Sandy

Windbreak suitability group: Glenross—10; Ekalaka—5

Pasture suitability group: Glenross—NS; Ekalaka—H

Gr—Grail silty clay loam**Composition**

Grail soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Plains

Landscape position: Foot slopes

Slope range: 0 to 2 percent

Shape of areas: Long and narrow or irregular

Size of areas: 10 to 150 acres

Typical Profile*Surface layer:*

0 to 8 inches—dark gray silty clay loam

Subsoil:

8 to 20 inches—dark grayish brown silty clay

20 to 39 inches—grayish brown, calcareous silty clay

Underlying layer:

39 to 60 inches—olive brown, calcareous silty clay loam

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderately slow

Available water capacity: High

Organic matter content: High

Surface runoff: Slow

Inclusions*Contrasting inclusions:*

- The sodium-affected Daglum soils on foot slopes
- Farnuf and Reeder soils, which have less clay in the subsoil than the Grail soil and are higher on the landscape
- Regent and Savage soils, which are dark to a depth of less than 16 inches and are higher on the landscape than the Grail soil

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Moisture conservation

Management measures:

- Minimizing tillage and leaving crop residue on the surface help to conserve moisture.

Interpretive Groups

Land capability classification: IIc-3

Range site: Loamy Overflow

Windbreak suitability group: 1

Pasture suitability group: K

Gs—Grassna silt loam

Composition

Grassna soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Plains

Landscape position: Foot slopes

Slope range: 0 to 2 percent

Shape of areas: Long and narrow or irregular

Size of areas: 10 to 30 acres

Typical Profile

Surface layer:

0 to 8 inches—very dark gray silt loam

Subsurface layer:

8 to 17 inches—very dark gray silt loam

Subsoil:

17 to 37 inches—very dark grayish brown and dark grayish brown silt loam

Underlying layer:

37 to 51 inches—grayish brown silt loam

51 to 60 inches—dark brown silt loam

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderate

Available water capacity: High

Organic matter content: High

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- Bryant soils, which are dark to a depth of less than

16 inches and are on back slopes

- Stady soils, which have sand and gravel at a depth of 20 to 40 inches and are on back slopes

Similar inclusions:

- Soils that have less silt or more clay than the Grassna soil

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Moisture conservation

Management measures:

- Minimizing tillage and leaving crop residue on the surface help to conserve moisture.

Interpretive Groups

Land capability classification: IIc-3

Range site: Loamy Overflow

Windbreak suitability group: 1

Pasture suitability group: K

Hd—Harriet loam

Composition

Harriet soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Flood plains

Landscape position: Low flood plains

Slope range: 0 to 1 percent

Shape of areas: Irregular

Size of areas: 10 to 100 acres

Typical Profile

Surface layer:

0 to 3 inches—gray loam

Subsoil:

3 to 9 inches—dark grayish brown, calcareous clay loam that has accumulations of salts

9 to 22 inches—grayish brown, calcareous clay that has accumulations of salts

22 to 40 inches—grayish brown, calcareous clay loam

Underlying layer:

40 to 60 inches—grayish brown, calcareous sandy clay loam that has accumulations of salts

Soil Properties and Qualities

Drainage class: Poorly drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: 0 to 1 foot

Flooding: Frequency—occasional; duration—long

Permeability: Very slow

Available water capacity: Moderate

Organic matter content: Moderate

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- The well drained Daglum and Rhoades soils that are higher on the landscape than the Harriet soil
- The poorly drained, saline Lallie soils on low flood plains

Similar inclusions:

- Soils that have less clay in the subsoil than the Harriet soil

Use and Management

Cropland and pasture

General management considerations:

- The soil is unsuited to cropland.

Management concerns: Wetness, compaction during wet periods, a sodium-affected subsoil and a content of salts that adversely affect crop growth by restricting root penetration, a slow rate of water intake

Management measures:

- Restricted grazing during wet periods helps to prevent surface compaction and the deterioration of tilth.
- Proper grazing management helps to maintain plant vigor and conserve moisture.

Interpretive Groups

Land capability classification: VIs-1

Range site: Saline Lowland

Windbreak suitability group: 10

Pasture suitability group: J

Hf—Havrelon loam

Composition

Havrelon soil and similar inclusions: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Flood plains

Landscape position: High flood plains

Slope range: 0 to 2 percent

Shape of areas: Long and narrow

Size of areas: 10 to 100 acres

Typical Profile

Surface layer:

0 to 4 inches—grayish brown loam

Subsurface layer:

4 to 11 inches—grayish brown, calcareous silt loam

Underlying layer:

11 to 42 inches—grayish brown, calcareous silt loam, loam, and thin layers of fine sandy loam

42 to 60 inches—light brownish gray, calcareous very fine sandy loam

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: Rare

Permeability: Moderate

Available water capacity: High

Organic matter content: Low

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- The sodium-affected Daglum and Rhoades soils in landscape positions similar to those of the Havrelon soil
- Trembles soils, which have less clay than the Havrelon soil and are on low terraces

Similar inclusions:

- Soils that have a surface layer that is deeper and darker than that of the Havrelon soil

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Wind erosion, lack of moisture for long-season crops

Management measures:

- Minimizing tillage and leaving crop residue on the surface help to conserve moisture, control erosion, and maintain tilth and the content of organic matter.

Interpretive Groups

Land capability classification: IIc-1

Range site: Loamy Overflow

Windbreak suitability group: 1

Pasture suitability group: F

Hg—Havrelon loam, channeled

Composition

Havrelon soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Flood plains

Landscape position: High flood plains

Slope range: 0 to 2 percent

Shape of areas: Long and narrow

Size of areas: 10 to 200 acres

Typical Profile

Surface layer:

0 to 4 inches—grayish brown loam

Subsurface layer:

4 to 11 inches—grayish brown, calcareous silt loam

Underlying layer:

11 to 42 inches—grayish brown, calcareous silt loam, loam, and thin layers of fine sandy loam

42 to 60 inches—light brownish gray, calcareous very fine sandy loam

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: Frequency—frequent; duration—brief

Permeability: Moderate

Available water capacity: High

Organic matter content: Low

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- Banks and Trembles soils, which have less clay than the Havrelon soil and are adjacent to the channels
- The poorly drained, saline Lallie soils on low flood plains
- The sodium-affected Rhoades soils in microlows
- Saline areas, which have barren, salt-crusts surfaces and are in low landscape positions

Similar inclusions:

- Soils that have less clay in the subsoil than the Havrelon soil

Use and Management

Cropland and pasture

General management considerations:

- The soil is unsuited to cropland.

Management concerns: Meandering channels, wetness, wind erosion

Management measures:

- Proper grazing management helps to maintain plant vigor.

Interpretive Groups

Land capability classification: Vlw-1

Range site: Loamy Overflow

Windbreak suitability group: 1

Pasture suitability group: F

Hn—Havrelon loam, terrace

Composition

Havrelon soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Terraces

Landscape position: High terraces

Slope range: 0 to 2 percent

Shape of areas: Elongated or irregular

Size of areas: 10 to 200 acres

Typical Profile

Surface layer:

0 to 4 inches—grayish brown loam

Subsurface layer:

4 to 11 inches—grayish brown, calcareous silt loam

Underlying layer:

11 to 42 inches—grayish brown, calcareous silt loam, loam, and thin layers of fine sandy loam

42 to 60 inches—light brownish gray, calcareous very fine sandy loam

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderate

Available water capacity: High

Organic matter content: Low

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- The sodium-affected Daglum and Rhoades soils that are lower on the landscape than the Havrelon soil
- Trembles soils, which have less clay than the Havrelon soil and are on low terraces

Similar inclusions:

- Soils that have less clay in the subsoil than the Havrelon soil

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Wind erosion, lack of moisture for long-season crops

Management measures:

- Minimizing tillage and leaving crop residue on the surface help to conserve moisture, control erosion, and maintain tilth and the content of organic matter.

Interpretive Groups

Land capability classification: IIc-1

Range site: Loamy Terrace

Windbreak suitability group: 3

Pasture suitability group: F

HrA—Havrelon-Rhoades loams, 0 to 4 percent slopes

Composition

Havrelon soil and similar inclusions: 50 to 60 percent

Rhoades soil and similar inclusions: 25 to 40 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Terraces

Landscape position: Havrelon—high terraces;
Rhoades—toe slopes

Slope range: 0 to 4 percent

Shape of areas: Elongated or irregular

Size of areas: 10 to 100 acres

Typical Profile

Havrelon

Surface layer:

0 to 4 inches—grayish brown loam

Subsurface layer:

4 to 11 inches—grayish brown, calcareous silt loam

Underlying layer:

11 to 42 inches—grayish brown, calcareous silt loam, loam, and thin layers of fine sandy loam

42 to 60 inches—light brownish gray, calcareous very fine sandy loam

Rhoades

Surface layer:

0 to 3 inches—dark grayish brown loam

Subsoil:

3 to 10 inches—grayish brown clay loam

10 to 25 inches—grayish brown, calcareous clay loam that has accumulations of salts

Underlying layer:

25 to 49 inches—grayish brown, calcareous clay loam that has accumulations of salts

49 to 60 inches—bedded shale

Soil Properties and Qualities

Drainage class: Havrelon—well drained; Rhoades—well drained and moderately well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: Havrelon—more than 60 inches; Rhoades—40 to more than 60 inches to shale

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Havrelon—moderate; Rhoades—very slow

Available water capacity: Havrelon—high; Rhoades—moderate

Organic matter content: Havrelon—low; Rhoades—moderate

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- The poorly drained, saline Lallie soils on low flood plains

- Trembles soils, which have less clay than the Havrelon and Rhoades soil and are in similar landscape positions

- Areas of Rock outcrop, which include exposures of bedrock and are on shoulders and back slopes

- Slickspots, which have salts at or near the surface and are in microlows on toe slopes

Similar inclusions:

- Rhoades soils that have a thicker surface layer or that have more clay in the subsoil

Use and Management

Cropland and pasture

General management considerations:

- Most of the acreage supports native grasses and is grazed.

Management concerns: Havrelon—wind erosion;

Rhoades—a sodium-affected subsoil that adversely affects crop growth by restricting root penetration, a slow rate of water intake

Management measures:

- Minimizing tillage and leaving crop residue on the surface help to conserve moisture and maintain the content of organic matter.

- Timely tillage, chiseling or subsoiling, and including grasses and legumes in the cropping system improve tilth and increase the rate of water intake in the Rhoades soil.

Interpretive Groups

Land capability classification: Havrelon—IIc-1;

Rhoades—VIs-1

Range site: Havrelon—Loamy Terrace; Rhoades—Thin Claypan

Windbreak suitability group: Havrelon—3; Rhoades—10

Pasture suitability group: Havrelon—F; Rhoades—C

Hs—Heil silt loam

Composition

Heil soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Plains

Landscape position: Basins

Slope range: 0 to 1 percent

Shape of areas: Circular or irregular

Size of areas: 10 to 200 acres

Typical Profile

Surface layer:

0 to 2 inches—gray silt loam

Subsoil:

2 to 18 inches—dark gray clay

18 to 27 inches—gray, calcareous clay that has accumulations of salts

27 to 33 inches—olive gray, mottled, calcareous clay that has accumulations of salts

Underlying layer:

33 to 41 inches—olive gray, mottled, calcareous clay

41 to 60 inches—light olive gray, calcareous clay loam

Soil Properties and Qualities

Drainage class: Poorly drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

The seasonal high water table: 1 foot above to 1 foot below the surface

Flooding: None

Permeability: Very slow

Available water capacity: Moderate

Organic matter content: Moderate

Surface runoff: Pondered

Inclusions

Contrasting inclusions:

- The well drained Arnegard soils on foot slopes
- The well drained Reeder soils on back slopes
- The well drained Rhoades soils on the lower foot slopes and toe slopes

Similar inclusions:

- Soils that have a surface layer that is thicker and darker than that of the Heil soil

Use and Management

Cropland and pasture

General management considerations:

- The soil is unsuited to cropland.

Management concerns: Wetness, compaction during wet periods, a sodium-affected subsoil that adversely affects crop growth by restricting root penetration, a slow rate of water intake

Management measures:

- Restricted grazing during wet periods helps to prevent

surface compaction and the deterioration of tilth.

- Proper grazing management helps to maintain plant vigor and conserve moisture.

Interpretive Groups

Land capability classification: VIs-1

Range site: Closed Depression

Windbreak suitability group: 10

Pasture suitability group: B2

HuB—Hurley silt loam, 0 to 9 percent slopes

Composition

Hurley soil and similar inclusions: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Plains

Landscape position: The lower foot slopes and toe slopes

Slope range: 0 to 9 percent

Shape of areas: Irregular

Size of areas: 10 to 200 acres

Typical Profile

Surface layer:

0 to 2 inches—grayish brown silt loam

Subsoil:

2 to 10 inches—dark grayish brown clay

10 to 25 inches—grayish brown, calcareous clay that has accumulations of salts

Underlying layer:

25 to 30 inches—grayish brown, calcareous clay

30 to 60 inches—bedded shale

Soil Properties and Qualities

Drainage class: Well drained and moderately well drained

Depth to bedrock: Moderately deep

Depth to a contrasting or impervious layer: 20 to 40 inches to shale

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Very slow

Available water capacity: Low

Organic matter content: Moderately low

Surface runoff: Medium

Inclusions

Contrasting inclusions:

- Bullcreek soils, which do not have a sodium-affected subsoil and are on the lower foot slopes
- Dupree and Promise soils, which do not have a

sodium-affected subsoil and are on the lower back slopes and foot slopes

- Opal soils, which do not have a sodium-affected subsoil and are on back slopes
- The sodium-affected Slickspots in microlows on the lower foot slopes

Similar inclusions:

- Soils that have a surface layer that is thicker than that of the Hurley soil
- Soils that have bedded shale at depth of more than 40 inches

Use and Management

Cropland and pasture

General management considerations:

- The soil is unsuited to cropland.

Management concerns: A sodium-affected subsoil and a content of salts that adversely affect crop growth by restricting root penetration, a slow rate of water intake

Management measures:

- Proper grazing management helps to maintain plant vigor and conserve moisture.

Interpretive Groups

Land capability classification: VIs-1

Range site: Thin Claypan

Windbreak suitability group: 10

Pasture suitability group: C

HwA—Hurley-Slickspots complex, 0 to 6 percent slopes

Composition

Hurley soil and similar inclusions: 50 to 65 percent

Slickspots and similar inclusions: 25 to 35 percent

Contrasting inclusions: 5 to 25 percent

Setting

Landform: Plains

Landscape position: Hurley—the lower foot slopes and toe slopes; Slickspots—microlows on the lower foot slopes and toe slopes

Slope range: 0 to 6 percent

Shape of areas: Long and narrow or irregular

Size of areas: 10 to 200 acres

Typical Profile

Hurley

Surface layer:

0 to 2 inches—grayish brown silt loam

Subsoil:

2 to 10 inches—dark grayish brown clay

10 to 25 inches—grayish brown, calcareous clay that has accumulations of salts

Underlying layer:

25 to 30 inches—grayish brown, calcareous clay

30 to 60 inches—bedded shale

Slickspots

- Slickspots have a light gray, dispersed surface crust and dense, massive underlying material.
- Accumulations of visible salts are at or near the surface.
- Slickspots are barren or nearly barren of vegetation.

Soil Properties and Qualities

Drainage class: Hurley—well drained and moderately well drained; Slickspots—moderately well drained

Depth to bedrock: Moderately deep

Depth to a contrasting or impervious layer: 20 to 40 inches to shale

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Very slow

Available water capacity: Low

Organic matter content: Moderately low

Surface runoff: Hurley—medium; Slickspots—slow

Inclusions

Contrasting inclusions:

- Bullcreek soils, which do not have a sodium-affected subsoil and are on the lower foot slopes
- Opal soils, which do not have a sodium-affected subsoil and are on back slopes
- Promise soils, which do not have a sodium-affected subsoil and are on the lower back slopes and foot slopes
- Wendte soils, which do not have a sodium-affected subsoil and are on high flood plains along drainageways

Similar inclusions:

- Soils that have a surface layer that is thicker than that of the Hurley soil
- Soils that have bedded shale at a depth of more than 40 inches

Use and Management

Cropland and pasture

General management considerations:

- Areas of this map unit are unsuited to cropland.

Management concerns: A sodium-affected subsoil and a content of salts that adversely affect crop growth by restricting root penetration, a slow rate of water intake

Management measures:

- Proper grazing management helps to maintain plant vigor and conserve moisture.

Interpretive Groups

Land capability classification: Hurley—VIs-1;

Slickspots—VIIIs-3

Range site: Hurley—Thin Claypan; Slickspots—none assigned

Windbreak suitability group: 10

Pasture suitability group: Hurley—C; Slickspots—NS

Ka—Korchea loam

Composition

Korchea soil and similar inclusions: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Flood plains

Landscape position: High flood plains

Slope range: 0 to 2 percent

Shape of areas: Long and narrow

Size of areas: 10 to 100 acres

Typical Profile

Surface layer:

0 to 9 inches—dark grayish brown, calcareous, stratified loam

Underlying layer:

9 to 30 inches—dark grayish brown, calcareous, stratified loam

30 to 60 inches—dark grayish brown and olive brown, calcareous clay loam

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: Rare

Permeability: Moderate

Available water capacity: High

Organic matter content: Moderate

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- The sodium-affected Daglum and Rhoades soils on toe slopes
- The poorly drained, saline Lallie soils on low flood plains

Similar inclusions:

- Soils that have a surface layer that is thinner and lighter colored than that of the Korchea soil

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Moisture conservation, rare flooding

Management measures:

- Minimizing tillage and leaving crop residue on the surface help to conserve moisture and maintain tilth and the content of organic matter.
- In some years flooding may delay planting, but in most years the additional moisture is beneficial and the flood damage is minor.

Interpretive Groups

Land capability classification: IIc-1

Range site: Loamy Overflow

Windbreak suitability group: 1

Pasture suitability group: F

Kc—Korchea loam, channeled

Composition

Korchea soil and similar inclusions: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Flood plains

Landscape position: High flood plains

Slope range: 0 to 2 percent

Shape of areas: Long and narrow

Size of areas: 10 to 100 acres

Typical Profile

Surface layer:

0 to 9 inches—dark grayish brown, calcareous, stratified loam

Underlying layer:

9 to 30 inches—dark grayish brown, calcareous, stratified loam

30 to 60 inches—dark grayish brown and olive brown, calcareous clay loam

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: Frequency—frequent; duration—brief

Permeability: Moderate

Available water capacity: High

Organic matter content: Moderate

Surface runoff: Slow



Figure 8.—A meandering channel in an area of Korchea loam, channeled.

Inclusions

Contrasting inclusions:

- The sodium-affected Daglum and Rhoades soils on toe slopes
- Havrelon soils, which are not dark below a depth of 7 inches and are on high flood plains
- The poorly drained, saline Lallie soils on low flood plains
- Saline areas, which have barren, salt-crusts surfaces and are in low landscape positions or along the side slopes of channels

Similar inclusions:

- Soils that have a surface layer that is thinner and

lighter colored than that of the Korchea soil

Use and Management

Cropland and pasture

General management considerations:

- The soil is unsuited to cropland.

Management concerns: Meandering channels (fig. 8), wetness

Management measures:

- Proper grazing management helps to maintain plant vigor.

Interpretive Groups

Land capability classification: VIw-1

Range site: Loamy Overflow
Windbreak suitability group: 1
Pasture suitability group: F

La—Lallie silty clay loam

Composition

Lallie soil and similar inclusions: 90 to 99 percent
 Contrasting inclusions: 1 to 10 percent

Setting

Landform: Flood plains
Landscape position: Low flood plains
Slope range: 0 to 2 percent
Shape of areas: Irregular
Size of areas: 5 to 60 acres

Typical Profile

Surface layer:
 0 to 2 inches—grayish brown, calcareous silty clay loam
Underlying layer:
 2 to 32 inches—light brownish gray, light olive gray, and olive gray, calcareous silty clay loam and clay having accumulations of salts
 32 to 60 inches—olive gray, mottled, calcareous clay

Soil Properties and Qualities

Drainage class: Poorly drained
Depth to bedrock: Deep
Depth to a contrasting or impervious layer: More than 60 inches
Depth to the seasonal high water table: 0 to 1 foot
Flooding: Frequency—occasional; duration—brief
Permeability: Slow
Available water capacity: Moderate
Organic matter content: Moderate
Surface runoff: Slow or very slow

Inclusions

Contrasting inclusions:

- The sodium-affected Glenross soils on toe slopes
- The sodium-affected Harriet soils on low flood plains

Similar inclusions:

- Soils that have less clay in the upper part than the Lallie soil
- Soils that have bedrock at a depth of 40 to 60 inches

Use and Management

Cropland and pasture

General management considerations:

- The soil is unsuited to cropland.

Management concerns: Wetness, a high concentration of salts

Management measures:

- Proper grazing management helps to maintain plant vigor.

Interpretive Groups

Land capability classification: VIIs-5
Range site: Saline Lowland
Windbreak suitability group: 10
Pasture suitability group: NS

LeA—Lehr loam, 0 to 2 percent slopes

Composition

Lehr soil and similar inclusions: 90 to 99 percent
 Contrasting inclusions: 1 to 10 percent

Setting

Landform: Terraces
Landscape position: Back slopes
Slope range: 0 to 2 percent
Shape of areas: Elongated or irregular
Size of areas: 15 to 100 acres

Typical Profile

Surface layer:
 0 to 6 inches—dark brown loam
Subsoil:
 6 to 17 inches—dark brown and brown loam
Underlying layer:
 17 to 30 inches—multicolored, calcareous gravelly loamy coarse sand
 30 to 60 inches—multicolored, calcareous very gravelly sand

Soil Properties and Qualities

Drainage class: Somewhat excessively drained
Depth to bedrock: Deep
Depth to a contrasting or impervious layer: 14 to 20 inches to sand and gravel
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Permeability: Moderately rapid in the subsoil and very rapid in the underlying gravelly sand
Available water capacity: Low
Organic matter content: Moderate
Surface runoff: Slow

Inclusions

Contrasting inclusions:

- Farnuf and Shambo soils, which are not underlain with sand and gravel and are on the lower back slopes and foot slopes
- Stady soils, which have sand and gravel at a depth of 20 to 40 inches and are on back slopes and foot slopes

- Wabek soils, which have sand and gravel at a depth of 7 to 14 inches and are on shoulders

Use and Management

Cropland and pasture

Main crops: Wheat and oats

Management concerns: The low available water capacity

Management measures:

- Minimizing tillage and leaving crop residue on the surface help to conserve moisture and maintain the content of organic matter.

Interpretive Groups

Land capability classification: IVs-1

Range site: Shallow to Gravel

Windbreak suitability group: 6

Pasture suitability group: D2

LeB—Lehr loam, 2 to 6 percent slopes

Composition

Lehr soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Terraces

Landscape position: Back slopes

Slope range: 2 to 6 percent

Shape of areas: Elongated or irregular

Size of areas: 15 to 100 acres

Typical Profile

Surface layer:

0 to 6 inches—dark brown loam

Subsoil:

6 to 17 inches—dark brown and brown loam

Underlying layer:

17 to 30 inches—multicolored, calcareous gravelly loamy coarse sand

30 to 60 inches—multicolored, calcareous very gravelly sand

Soil Properties and Qualities

Drainage class: Somewhat excessively drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: 14 to 20 inches to sand and gravel

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderately rapid in the subsoil and very rapid in the underlying gravelly sand

Available water capacity: Low

Organic matter content: Moderate

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- Farnuf and Shambo soils, which are not underlain with sand and gravel and are on the lower back slopes and foot slopes

- Stady soils, which have sand and gravel at a depth of 20 to 40 inches and are on back slopes and foot slopes

- Wabek soils, which have sand and gravel at a depth of 7 to 14 inches and are on shoulders

Use and Management

Cropland and pasture

Main crops: Wheat and oats

Management concerns: Water erosion, the low available water capacity

Management measures:

- Minimizing tillage, leaving crop residue on the surface, and constructing grassed waterways help to conserve moisture, control erosion, and maintain the content of organic matter.

Interpretive Groups

Land capability classification: IVE-6

Range site: Shallow to Gravel

Windbreak suitability group: 6

Pasture suitability group: D2

Mc—McKenzie clay

Composition

McKenzie soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Plains

Landscape position: Basins

Slope range: 0 to 1 percent

Shape of areas: Circular or irregular

Size of areas: 4 to 25 acres

Typical Profile

Surface layer:

0 to 3 inches—gray clay

Subsoil:

3 to 23 inches—gray and olive gray, calcareous clay

Underlying layer:

23 to 60 inches—olive gray and light olive gray, mottled, calcareous clay

Soil Properties and Qualities

Drainage class: Poorly drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

The seasonal high water table: 0.5 foot above to 1.0 foot below the surface

Flooding: None

Permeability: Very slow

Available water capacity: Moderate

Organic matter content: High

Surface runoff: Very slow or ponded

Inclusions

Contrasting inclusions:

- Harriet and Lallie soils, which have visible salts at or near the surface and are on the edges of mapped areas
- The sodium-affected Heil soils on the edges of mapped areas

Use and Management

Cropland and pasture

General management considerations:

- The soil is unsuited to cropland.

Management concerns: Wetness

Management measures:

- Proper grazing management helps to maintain plant vigor.
- Restricted grazing during wet periods helps to prevent compaction and the deterioration of tilth.

Interpretive Groups

Land capability classification: Vw-4

Range site: Closed Depression

Windbreak suitability group: 10

Pasture suitability group: B2

OaB—Opal clay, 2 to 6 percent slopes

Composition

Opal soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Dissected plains

Landscape position: Back slopes

Slope range: 2 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 200 acres

Typical Profile

Surface layer:

0 to 4 inches—dark grayish brown clay

Subsoil:

4 to 16 inches—dark grayish brown, calcareous clay

16 to 22 inches—grayish brown, calcareous clay

Underlying layer:

22 to 36 inches—light brownish gray, calcareous clay

36 to 60 inches—bedded shale

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Moderately deep

Depth to a contrasting or impervious layer: 20 to 40 inches to shale

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Very slow

Available water capacity: Low

Organic matter content: Moderate

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- Bullcreek and Hurley soils, which have more salts than the Opal soil and are on the lower foot slopes and toe slopes
- Sansarc soils, which have bedded shale within a depth of 20 inches and are on shoulders

Similar inclusions:

- Soils that do not have free carbonates
- Soils that have bedded shale at a depth of more than 40 inches

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Wind erosion, water erosion, the low available water capacity, a slow rate of water intake

Management measures:

- Minimizing tillage, leaving crop residue on the surface, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain the content of organic matter.
- Chiseling and subsoiling improve tilth and increase the rate of water intake.
- Contour farming and grassed waterways help to control erosion.

Interpretive Groups

Land capability classification: IIIe-4

Range site: Clayey

Windbreak suitability group: 4

Pasture suitability group: 1

OaC—Opal clay, 6 to 9 percent slopes

Composition

Opal soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Dissected plains

Landscape position: Back slopes

Slope range: 6 to 9 percent

Shape of areas: Irregular

Size of areas: 10 to 200 acres

Typical Profile

Surface layer:

0 to 4 inches—dark grayish brown clay

Subsoil:

4 to 16 inches—dark grayish brown, calcareous clay

16 to 22 inches—grayish brown, calcareous clay

Underlying layer:

22 to 36 inches—light brownish gray, calcareous clay

36 to 60 inches—bedded shale

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Moderately deep

Depth to a contrasting or impervious layer: 20 to 40 inches to shale

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Very slow

Available water capacity: Low

Organic matter content: Moderate

Surface runoff: Medium

Inclusions

Contrasting inclusions:

- Dupree and Sansarc soils, which have bedded shale within a depth of 20 inches and are higher on the landscape than the Opal soil
- The sodium-affected Hurley soils on the lower foot slopes and toe slopes

Similar inclusions:

- Soils that do not have free carbonates
- Soils that have bedded shale at a depth of more than 40 inches

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Wind erosion, water erosion, the low available water capacity, a slow rate of water intake

Management measures:

- Minimizing tillage, leaving crop residue on the surface, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain the content of organic matter.
- Chiseling and subsoiling improve tilth and increase the rate of water intake.
- Contour farming, terraces, and grassed waterways help to control erosion.

Interpretive Groups

Land capability classification: IVE-4

Range site: Clayey

Windbreak suitability group: 4

Pasture suitability group: I

OdC—Opal-Dupree clays, 2 to 9 percent slopes

Composition

Opal soil and similar inclusions: 55 to 65 percent

Dupree soil and similar inclusions: 25 to 35 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Dissected plains

Landscape position: Opal—the upper back slopes;

Dupree—back slopes and foot slopes

Slope range: 2 to 9 percent

Shape of areas: Irregular

Size of areas: 10 to 500 acres

Typical Profile

Opal

Surface layer:

0 to 4 inches—dark grayish brown clay

Subsoil:

4 to 16 inches—dark grayish brown, calcareous clay

16 to 22 inches—grayish brown, calcareous clay

Underlying layer:

22 to 36 inches—light brownish gray, calcareous clay

36 to 60 inches—bedded shale

Dupree

Surface layer:

0 to 3 inches—gray clay

Subsoil:

3 to 15 inches—gray and grayish brown clay

Underlying layer:

15 to 60 inches—bedded shale

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Opal—moderately deep; Dupree—shallow

Depth to a contrasting or impervious layer: Opal—20 to 40 inches to shale; Dupree—10 to 20 inches to shale

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Very slow

Available water capacity: Opal—low; Dupree—very low

Organic matter content: Opal—moderate; Dupree—moderately low
Surface runoff: Medium

Inclusions

Contrasting inclusions:

- Bullcreek and Hurley soils, which have more salts than the Opal soil and are on foot slopes
- The poorly drained, saline Lallie soils in low areas and seep areas on side slopes
- Areas of bedded shale outcrop, which are barren of vegetation and are on shoulders and back slopes

Similar inclusions:

- Soils that have bedded shale at a depth of more than 40 inches

Use and Management

Cropland and pasture

General management considerations:

- The Dupree soil is unsuited to cropland.
- Most of the acreage supports native grasses and is grazed.

Main crops: Wheat, oats, and alfalfa in areas of the Opal soil

Management concerns: Wind erosion, water erosion, the low available water capacity in the Opal soil, the very low available water capacity in the Dupree soil, a slow rate of water intake

Management measures:

- Minimizing tillage, leaving crop residue on the surface, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain the content of organic matter.
- Chiseling and subsoiling improve tilth and increase the rate of water intake.
- Contour farming and grassed waterways help to control erosion.

Interpretive Groups

Land capability classification: Opal—IVe-4; Dupree—VIe-12

Range site: Opal—Clayey; Dupree—Dense Clay

Windbreak suitability group: Opal—4; Dupree—10

Pasture suitability group: Opal—I; Dupree—NS

OhB—Opal-Hurley complex, 0 to 9 percent slopes

Composition

Opal soil and similar inclusions: 50 to 60 percent
 Hurley soil and similar inclusions: 30 to 40 percent
 Contrasting inclusions: 1 to 10 percent

Setting

Landform: Dissected plains

Landscape position: Opal—back slopes; Hurley—the lower back slopes and foot slopes

Slope range: 0 to 9 percent

Shape of areas: Irregular

Size of areas: 10 to 100 acres

Typical Profile

Opal

Surface layer:

0 to 4 inches—dark grayish brown clay

Subsoil:

4 to 16 inches—dark grayish brown, calcareous clay

16 to 22 inches—grayish brown, calcareous clay

Underlying layer:

22 to 36 inches—light brownish gray, calcareous clay

36 to 60 inches—bedded shale

Hurley

Surface layer:

0 to 2 inches—grayish brown silt loam

Subsoil:

2 to 10 inches—dark grayish brown clay

10 to 25 inches—grayish brown, calcareous clay that has accumulations of salts

Underlying layer:

25 to 30 inches—grayish brown, calcareous clay

30 to 60 inches—bedded shale

Soil Properties and Qualities

Drainage class: Opal—well drained; Hurley—well drained and moderately well drained

Depth to bedrock: Moderately deep

Depth to a contrasting or impervious layer: 20 to 40 inches to shale

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Very slow

Available water capacity: Low

Organic matter content: Opal—moderate; Hurley—moderately low

Surface runoff: Medium

Inclusions

Contrasting inclusions:

- Slickspots, which have salts at or near the surface and are in microlows

Similar inclusions:

- Opal soils that do not have free carbonates
- Soils that have bedded shale at a depth of more than 40 inches

Use and Management

Cropland and pasture

General management considerations:

- The Hurley soil is unsuited to cropland.
- Most of the acreage supports native grasses and is grazed.

Main crops: Wheat, oats, and alfalfa in areas of the Opal soil

Management concerns: Wind erosion, water erosion, the low available water capacity, a slow rate of water intake, a sodium-affected subsoil in the Hurley soil that adversely affects crop growth by restricting root penetration

Management measures:

- Minimizing tillage, leaving crop residue on the surface, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain the content of organic matter.
- Chiseling and subsoiling improve tilth and increase the rate of water intake.
- Contour farming and grassed waterways help to control water erosion.

Interpretive Groups

Land capability classification: Opal—IIIe-4; Hurley—VIs-1

Range site: Opal—Clayey; Hurley—Thin Claypan

Windbreak suitability group: Opal—4; Hurley—10

Pasture suitability group: Opal—I; Hurley—C

OsC—Opal-Sansarc clays, 6 to 15 percent slopes

Composition

Opal soil and similar inclusions: 50 to 70 percent

Sansarc soil and similar inclusions: 20 to 35 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Dissected plains

Landscape position: Opal—back slopes; Sansarc—shoulders

Slope range: Opal—6 to 15 percent; Sansarc—9 to 15 percent

Shape of areas: Irregular

Size of areas: 10 to 100 acres

Typical Profile

Opal

Surface layer:

0 to 4 inches—dark grayish brown clay

Subsoil:

4 to 16 inches—dark grayish brown, calcareous clay

16 to 22 inches—grayish brown, calcareous clay

Underlying layer:

22 to 36 inches—light brownish gray, calcareous clay

36 to 60 inches—bedded shale

Sansarc

Surface layer:

0 to 4 inches—grayish brown, calcareous clay

Subsurface layer:

4 to 10 inches—grayish brown, calcareous clay

Underlying layer:

10 to 16 inches—grayish brown, calcareous clay

16 to 60 inches—bedded shale

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Opal—moderately deep; Sansarc—shallow

Depth to a contrasting or impervious layer: Opal—20 to 40 inches to shale; Sansarc—6 to 20 inches to shale

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Very slow

Available water capacity: Opal—low; Sansarc—very low

Organic matter content: Opal—moderate; Sansarc—moderately low

Surface runoff: Medium

Inclusions

Contrasting inclusions:

- Bullcreek and Hurley soils, which have more salts than the Opal soil, are deeper to bedded shale than the Sansarc soil, and are on foot slopes

Similar inclusions:

- Soils that do not have free carbonates
- Opal soils that have bedded shale at a depth of more than 40 inches
- Sansarc soils that are very firm or extremely firm

Use and Management

Cropland and pasture

General management considerations:

- The Sansarc soil is unsuited to cropland.
- Most of the acreage supports native grasses and is grazed.

Main crops: Wheat, oats, and alfalfa in areas of the Opal soil

Management concerns: Wind erosion, water erosion, the low available water capacity in the Opal soil, the very low available water capacity in the Sansarc soil, a slow rate of water intake in both soils

Management measures:

- Minimizing tillage, leaving crop residue on the surface,

and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain the content of organic matter.

- Chiseling and subsoiling improve tilth and increase the rate of water intake.
- Contour farming and grassed waterways help to control water erosion.

Interpretive Groups

Land capability classification: Opal—IVe-4; Sansarc—Vle-12

Range site: Opal—Clayey; Sansarc—Shallow Clay

Windbreak suitability group: Opal—4; Sansarc—10

Pasture suitability group: Opal—I; Sansarc—NS

PaB—Parchin fine sandy loam, 0 to 9 percent slopes

Composition

Parchin soil and similar inclusions: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Plains

Landscape position: Back slopes and foot slopes

Slope range: 0 to 9 percent

Shape of areas: Irregular

Size of areas: 10 to 150 acres

Typical Profile

Surface layer:

0 to 6 inches—grayish brown fine sandy loam

Subsurface layer:

6 to 10 inches—grayish brown fine sandy loam

Subsoil:

10 to 17 inches—brown sandy clay loam

17 to 24 inches—brown, calcareous fine sandy loam

Underlying layer:

24 to 29 inches—soft, weakly cemented sandstone that is stratified with lenses of loamy material

29 to 60 inches—soft, weakly cemented sandstone

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Moderately deep

Depth to a contrasting or impervious layer: 20 to 40 inches to soft sandstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Slow

Available water capacity: Low

Organic matter content: Moderately low

Surface runoff: Medium

Inclusions

Contrasting inclusions:

- Bullock soils, which have visible salts within a depth of 16 inches and are on foot slopes
- Evridge, Ekalaka, Telfer, and Vebar soils, which have less clay than the Parchin soil and are higher on the landscape

Similar inclusions:

- Soils that have more clay in the subsoil than the Parchin soil

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Wind erosion, the low available water capacity, a sodium-affected subsoil that adversely affects crop growth by restricting root penetration, a slow rate of water intake

Management measures:

- Minimizing tillage, leaving crop residue on the surface, stripcropping, establishing field windbreaks, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain the content of organic matter.
- Chiseling and subsoiling improve tilth and increase the rate of water intake.

Interpretive Groups

Land capability classification: IVe-7

Range site: Claypan

Windbreak suitability group: 9

Pasture suitability group: C

PdD—Parchin-Bullock-Cabba complex, 6 to 30 percent slopes

Composition

Parchin soil and similar inclusions: 30 to 40 percent

Bullock soil and similar inclusions: 20 to 30 percent

Cabba soil and similar inclusions: 20 to 30 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Dissected plains

Landscape position: Parchin—back slopes and foot slopes; Bullock—the lower foot slopes; Cabba—shoulders and the upper back slopes

Slope range: Parchin and Bullock—6 to 9 percent; Cabba—9 to 30 percent

Shape of areas: Elongated or irregular

Size of areas: 10 to 100 acres

Typical Profile

Parchin

Surface layer:

0 to 6 inches—grayish brown fine sandy loam

Subsurface layer:

6 to 10 inches—grayish brown fine sandy loam

Subsoil:

10 to 17 inches—brown sandy clay loam

17 to 24 inches—brown, calcareous fine sandy loam

Underlying layer:

24 to 29 inches—soft, weakly cemented sandstone that is stratified with lenses of loamy material

29 to 60 inches—soft, weakly cemented sandstone

Bullock

Surface layer:

0 to 4 inches—grayish brown fine sandy loam

Subsoil:

4 to 10 inches—grayish brown sandy clay loam

10 to 15 inches—grayish brown, calcareous sandy loam that has accumulations of salts

Underlying layer:

15 to 23 inches—light brownish gray, calcareous clay loam that has accumulations of salts

23 to 60 inches—soft sandstone

Cabba

Surface layer:

0 to 4 inches—dark grayish brown loam

Underlying layer:

4 to 10 inches—grayish brown, calcareous loam

10 to 32 inches—grayish brown, weakly cemented sandstone

32 to 60 inches—soft siltstone

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Parchin and Bullock—moderately deep; Cabba—shallow

Depth to a contrasting or impervious layer: Parchin and Bullock—20 to 40 inches to soft sandstone; Cabba—10 to 20 inches to soft sandstone and siltstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Parchin—slow; Bullock—very slow; Cabba—moderate

Available water capacity: Parchin and Bullock—low; Cabba—very low

Organic matter content: Parchin and Bullock—moderately low; Cabba—low

Surface runoff: Parchin and Bullock—medium; Cabba—rapid

Inclusions

Contrasting inclusions:

- Cohagen soils, which have less clay than the Cabba soil and are in similar landscape positions
- Areas of Rock outcrop, which include eroding exposures of bedrock and are on shoulders and back slopes along drainageways and escarpments
- Slickspots, which have salts at or near the surface and are in microlows on foot slopes

Similar inclusions:

- Soils that have more clay in the subsoil than the Parchin, Bullock, and Cabba soils

Use and Management

Cropland and pasture

General management considerations:

- The soils are unsuited to cropland.

Management concerns: Parchin and Bullock—wind erosion, water erosion, a sodium-affected subsoil and a content of salts that adversely affect crop growth by restricting root penetration, a slow rate of water intake, the low available water capacity; Cabba—wind erosion, water erosion, the very low available water capacity

Management measures:

- Proper grazing management helps to maintain plant vigor, conserve moisture, and control erosion.

Interpretive Groups

Land capability classification: Parchin—Vle-9; Bullock—Vls-1; Cabba—Vle-11

Range site: Parchin—Claypan; Bullock—Thin Claypan; Cabba—Shallow

Windbreak suitability group: 10

Pasture suitability group: Parchin and Bullock—C; Cabba—NS

PeA—Parshall fine sandy loam, 0 to 6 percent slopes

Composition

Parshall soil and similar inclusions: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Plains

Landscape position: Foot slopes

Slope range: 0 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 150 acres

Typical Profile

Surface layer:

0 to 7 inches—very dark grayish brown fine sandy loam

Subsurface layer:

7 to 11 inches—very dark grayish brown fine sandy loam

Subsoil:

11 to 30 inches—dark brown fine sandy loam

Underlying layer:

30 to 60 inches—dark yellowish brown and light olive brown fine sandy loam

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderately rapid

Available water capacity: Moderate

Organic matter content: Moderate

Surface runoff: Slow

Inclusions*Contrasting inclusions:*

- The sodium-affected Ekalaka soils on foot slopes
- Reeder and Vebar soils, which are dark to a depth of less than 16 inches and are higher on the landscape than the Parshall soil

Similar inclusions:

- Soils that have more clay in the subsoil than the Parshall soil
- Soils that have soft bedrock or coarser material at a depth of 40 to 60 inches

Use and Management**Cropland and pasture**

Main crops: Wheat, oats, and alfalfa

Management concerns: Wind erosion

Management measures:

- Minimizing tillage, leaving crop residue on the surface, stripcropping, and establishing field windbreaks help to conserve moisture, control erosion, and maintain the content of organic matter.

Interpretive Groups

Land capability classification: IIIe-7

Range site: Sandy

Windbreak suitability group: 1

Pasture suitability group: H

Pg—Pits, gravel**Composition**

Pits and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landform: Plains

Landscape position: Summits, shoulders, and back slopes

Slope range: 0 to 60 percent

Shape of areas: Irregular

Size of areas: 10 to 80 acres

Typical Profile

- The bottom of pits generally is sand and gravel; it is sandstone or siltstone bedrock in areas where all of the sand and gravel has been removed.
- In some areas the bottom is loam or clay loam, and in other areas it is shale.
- Mounds of mixed loamy overburden are at the edges of the excavated areas.

Soil Properties and Qualities

Drainage class: Excessively drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: 0 to 10 inches to sand and gravel

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Rapid

Available water capacity: Low

Organic matter content: Moderately low

Surface runoff: Slow

Use and Management**Cropland and pasture***General management considerations:*

- Areas of this map unit are unsuited to cropland.
- Most gravel pits are used only as a source of sand and gravel for construction purposes; some pits provide limited wildlife habitat.
- The bottom and sides of pits support little or no vegetation during periods when gravel is being removed.
- Abandoned gravel pits can be restored to range, tame pasture, or cropland if reclamation measures are applied.

Management measures:

- Land shaping and using the mounds of overburden material as topsoil dressing are needed to reclaim areas of this unit.
- Applying fertilizer as needed helps to establish range or pasture plants.

Interpretive Groups

Land capability classification: VIIIs-2

Range site: None assigned

Windbreak suitability group: 10

Pasture suitability group: NS

PrA—Promise clay, 0 to 2 percent slopes

Composition

Promise soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Plains

Landscape position: The lower back slopes and foot slopes

Slope range: 0 to 1 percent

Shape of areas: Irregular

Size of areas: 10 to 600 acres

Typical Profile

Surface layer:

0 to 9 inches—dark grayish brown clay

Subsoil:

9 to 26 inches—grayish brown, calcareous clay

26 to 34 inches—grayish brown, calcareous clay

Underlying layer:

34 to 60 inches—grayish brown, calcareous clay that has accumulations of salts

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: 40 to more than 60 inches to shale

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Very slow

Available water capacity: Moderate

Organic matter content: Moderate

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- Bullcreek soils, which have visible salts at or near the surface and are lower on the landscape than the Promise soil
- The stratified Wendte soils on high flood plains along drainageways

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Wind erosion, the very slow permeability, a slow rate of water intake

Management measures:

- Minimizing tillage, leaving crop residue on the surface,

strip cropping, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain the content of organic matter.

- Chiseling and subsoiling improve tilth and increase the rate of water intake.

Interpretive Groups

Land capability classification: IIIs-3

Range site: Clayey

Windbreak suitability group: 4

Pasture suitability group: I

PrB—Promise clay, 2 to 6 percent slopes

Composition

Promise soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Plains

Landscape position: The lower back slopes and foot slopes

Slope range: 2 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 150 acres

Typical Profile

Surface layer:

0 to 9 inches—dark grayish brown clay

Subsoil:

9 to 26 inches—grayish brown, calcareous clay

26 to 34 inches—grayish brown, calcareous clay

Underlying layer:

34 to 60 inches—grayish brown, calcareous clay that has accumulations of salts

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: 40 to more than 60 inches to shale

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Very slow

Available water capacity: Moderate

Organic matter content: Moderate

Surface runoff: Medium

Inclusions

Contrasting inclusions:

- Bullcreek soils, which have visible salts at or near the surface and are lower on the landscape than the Promise soil

- The sodium-affected Hurley soils on the lower back slopes and toe slopes

Similar inclusions:

- Soils that have bedded shale within a depth of 40 inches

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Wind erosion, water erosion, the very slow permeability, a slow rate of water intake

Management measures:

- Minimizing tillage, leaving crop residue on the surface, stripcropping, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain the content of organic matter.
- Chiseling and subsoiling improve tilth and increase the rate of water intake.
- Contour farming and grassed waterways help to control water erosion.

Interpretive Groups

Land capability classification: IIIe-4

Range site: Clayey

Windbreak suitability group: 4

Pasture suitability group: I

RaA—Reeder loam, 0 to 2 percent slopes

Composition

Reeder soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Dissected plains

Landscape position: Back slopes

Slope range: 0 to 2 percent

Shape of areas: Irregular

Size of areas: 10 to 100 acres

Typical Profile

Surface layer:

0 to 6 inches—dark grayish brown loam

Subsoil:

6 to 17 inches—dark brown and olive brown clay loam

17 to 34 inches—grayish brown, calcareous clay loam

Underlying layer:

34 to 60 inches—soft, weakly cemented sandstone

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Moderately deep

Depth to a contrasting or impervious layer: 20 to 40 inches to soft sandstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderate

Available water capacity: Moderate

Organic matter content: Moderate

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- Arnegard soils, which are dark to a depth of more than 16 inches and are on foot slopes
- The sodium-affected Belfield and Daglum soils on the lower back slopes and foot slopes
- The sodium-affected Rhoades soils on the lower foot slopes and toe slopes

Similar inclusions:

- Soils that have less clay in the subsoil than the Reeder soil

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Moisture conservation

Management measures:

- Minimizing tillage and leaving crop residue on the surface help to conserve moisture and maintain tilth and the content of organic matter.

Interpretive Groups

Land capability classification: IIc-2

Range site: Silty

Windbreak suitability group: 6

Pasture suitability group: F

RaB—Reeder loam, 2 to 6 percent slopes

Composition

Reeder soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Dissected plains

Landscape position: Back slopes

Slope range: 2 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 1,000 acres

Typical Profile

Surface layer:

0 to 6 inches—dark grayish brown loam

Subsoil:

6 to 17 inches—dark brown and olive brown clay loam

17 to 34 inches—grayish brown, calcareous clay loam

Underlying layer:

34 to 60 inches—soft, weakly cemented sandstone

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Moderately deep

Depth to a contrasting or impervious layer: 20 to 40 inches to soft sandstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderate

Available water capacity: Moderate

Organic matter content: Moderate

Surface runoff: Medium

Inclusions*Contrasting inclusions:*

- Arnegard soils, which are dark to a depth of more than 16 inches and are on foot slopes
- The sodium-affected Belfield and Daglum soils on the lower back slopes and foot slopes
- Cabba soils, which have bedrock within a depth of 20 inches and are on shoulders
- The sodium-affected Rhoades soils on the lower foot slopes and toe slopes

Similar inclusions:

- Soils that have less clay in the subsoil than the Reeder soil

Use and Management**Cropland and pasture**

Main crops: Wheat, oats, and alfalfa

Management concerns: Water erosion

Management measures:

- Minimizing tillage, leaving crop residue on the surface, stripcropping, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain tilth and the content of organic matter.
- Contour farming and grassed waterways help to control water erosion.

Interpretive Groups

Land capability classification: IIe-1

Range site: Silty

Windbreak suitability group: 6

Pasture suitability group: F

RaC—Reeder loam, 6 to 9 percent slopes**Composition**

Reeder soil and similar inclusions: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Dissected plains

Landscape position: Back slopes

Slope range: 6 to 9 percent

Shape of areas: Irregular

Size of areas: 10 to 50 acres

Typical Profile

Surface layer:

0 to 6 inches—dark grayish brown loam

Subsoil:

6 to 17 inches—dark brown and olive brown clay loam

17 to 34 inches—grayish brown, calcareous clay loam

Underlying layer:

34 to 60 inches—soft, weakly cemented sandstone

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Moderately deep

Depth to a contrasting or impervious layer: 20 to 40 inches to soft sandstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderate

Available water capacity: Moderate

Organic matter content: Moderate

Surface runoff: Medium

Inclusions*Contrasting inclusions:*

- Arnegard soils, which are dark to a depth of more than 16 inches and are on foot slopes
- Cabba and Cohagen soils, which have bedrock at a depth of 10 to 20 inches and are on shoulders
- The sodium-affected Daglum and Rhoades soils on foot slopes and toe slopes
- Regent soils, which have more clay than the Reeder soil and are in similar landscape positions
- Vebar soils, which have less clay than the Reeder soil and are in similar landscape positions

Similar inclusions:

- Soils that have less clay in the subsoil than the Reeder soil

Use and Management**Cropland and pasture**

Main crops: Wheat, oats, and alfalfa

Management concerns: Water erosion

Management measures:

- Minimizing tillage, leaving crop residue on the surface, stripcropping, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain tilth and the content of organic matter.

- Contour farming, terraces, and grassed waterways help to control erosion.
- In some areas slopes are too short and too irregular for contouring and terracing.

Interpretive Groups

Land capability classification: IIIe-1

Range site: Silty

Windbreak suitability group: 6

Pasture suitability group: F

RcB—Reeder-Cabba loams, 3 to 6 percent slopes

Composition

Reeder soil and similar inclusions: 55 to 75 percent

Cabba soil and similar inclusions: 30 to 40 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Dissected plains

Landscape position: Reeder—back slopes; Cabba—shoulders

Slope range: 3 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 100 acres

Typical Profile

Reeder

Surface layer:

0 to 6 inches—dark grayish brown loam

Subsoil:

6 to 17 inches—dark brown and olive brown clay loam

17 to 34 inches—grayish brown, calcareous clay loam

Underlying layer:

34 to 60 inches—soft, weakly cemented sandstone

Cabba

Surface layer:

0 to 4 inches—dark grayish brown loam

Underlying layer:

4 to 10 inches—grayish brown, calcareous loam

10 to 32 inches—grayish brown, weakly cemented sandstone

32 to 60 inches—soft siltstone

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Reeder—moderately deep; Cabba—shallow

Depth to a contrasting or impervious layer: Reeder—20 to 40 inches to soft sandstone; Cabba—10 to 20 inches to soft sandstone and siltstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderate

Available water capacity: Reeder—moderate; Cabba—very low

Organic matter content: Reeder—moderate; Cabba—low

Surface runoff: Medium

Inclusions

Contrasting inclusions:

- Arnegard soils, which are dark to a depth of more than 16 inches and are on foot slopes
- The sodium-affected Belfield and Daglum soils on the lower back slopes and foot slopes
- Regent soils, which have more clay than the Reeder and Cabba soils and are in landscape positions similar to those of the Reeder soil
- The sodium-affected Rhoades soils on the lower foot slopes and toe slopes

Similar inclusions:

- Reeder soils that have less clay in the subsoil

Use and Management

Cropland and pasture

General management considerations:

- The Cabba soil is unsuited to cropland.

Main crops: Wheat, oats, and alfalfa in areas of the Reeder soil

Management concerns: Reeder—water erosion;

Cabba—wind erosion, water erosion, the very low available water capacity, a high content of lime that adversely affects the availability of plant nutrients

Management measures:

- Minimizing tillage, leaving crop residue on the surface, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain fertility, tilth, and the content of organic matter.
- Contour farming and grassed waterways help to control water erosion.

Interpretive Groups

Land capability classification: Reeder—Ile-1; Cabba—VIe-11

Range site: Reeder—Silty; Cabba—Shallow

Windbreak suitability group: Reeder—6; Cabba—10

Pasture suitability group: Reeder—F; Cabba—G

RcC—Reeder-Cabba loams, 6 to 9 percent slopes

Composition

Reeder soil and similar inclusions: 50 to 65 percent

Cabba soil and similar inclusions: 30 to 40 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Dissected plains

Landscape position: Reeder—back slopes; Cabba—shoulders

Slope range: 6 to 9 percent

Shape of areas: Irregular

Size of areas: 10 to 75 acres

Typical Profile

Reeder

Surface layer:

0 to 6 inches—dark grayish brown loam

Subsoil:

6 to 17 inches—dark brown and olive brown clay loam

17 to 34 inches—grayish brown, calcareous clay loam

Underlying layer:

34 to 60 inches—soft, weakly cemented sandstone

Cabba

Surface layer:

0 to 4 inches—dark grayish brown loam

Underlying layer:

4 to 10 inches—grayish brown, calcareous loam

10 to 32 inches—grayish brown, weakly cemented sandstone

32 to 60 inches—soft siltstone

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Reeder—moderately deep; Cabba—shallow

Depth to a contrasting or impervious layer: Reeder—20 to 40 inches to soft sandstone; Cabba—10 to 20 inches to soft sandstone and siltstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderate

Available water capacity: Reeder—moderate; Cabba—very low

Organic matter content: Reeder—moderate; Cabba—low

Surface runoff: Medium

Inclusions

Contrasting inclusions:

- Arnegard soils, which are dark to a depth of more than 16 inches and are on foot slopes
- Cohagen and Vebar soils, which have less clay than the Reeder and Cabba soils and are higher on the landscape
- The sodium-affected Daglum and Rhoades soils on foot slopes and toe slopes
- Regent soils, which have more clay than the Reeder and Cabba soils and are in similar landscape positions

Similar inclusions:

- Reeder soils that have less clay in the subsoil

Use and Management

Cropland and pasture

General management considerations:

- The Cabba soil is unsuited to cropland.

Main crops: Wheat, oats, and alfalfa in areas of the Reeder soil

Management concerns: Reeder—water erosion;

Cabba—wind erosion, water erosion, the very low available water capacity, a high content of lime that adversely affects the availability of plant nutrients

Management measures:

- Minimizing tillage, leaving crop residue on the surface, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain fertility, tilth, and the content of organic matter.
- Contour farming, terraces, and grassed waterways help to control water erosion, but in most areas slopes are too short and too irregular for contouring and terracing.

Interpretive Groups

Land capability classification: Reeder—Ille-1; Cabba—Vle-11

Range site: Reeder—Silty; Cabba—Shallow

Windbreak suitability group: Reeder—6; Cabba—10

Pasture suitability group: Reeder—F; Cabba—G

RhB—Reeder-Rhoades loams, 2 to 9 percent slopes

Composition

Reeder soil and similar inclusions: 50 to 70 percent

Rhoades soil and similar inclusions: 20 to 40 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landform: Dissected plains

Landscape position: Reeder—back slopes; Rhoades—foot slopes and toe slopes

Slope range: 2 to 9 percent

Shape of areas: Irregular

Size of areas: 20 to 100 acres

Typical Profile

Reeder

Surface layer:

0 to 6 inches—dark grayish brown loam

Subsoil:

6 to 17 inches—dark brown and olive brown clay loam

17 to 34 inches—grayish brown, calcareous clay loam

Underlying layer:

34 to 60 inches—soft, weakly cemented sandstone

Rhoades*Surface layer:*

0 to 3 inches—dark grayish brown loam

Subsoil:

3 to 10 inches—grayish brown clay loam

10 to 25 inches—grayish brown, calcareous clay loam that has accumulations of salts

Underlying layer:

25 to 49 inches—grayish brown, calcareous clay loam that has accumulations of salts

49 to 60 inches—bedded shale

Soil Properties and Qualities

Drainage class: Reeder—well drained; Rhoades—well drained and moderately well drained

Depth to bedrock: Reeder—moderately deep; Rhoades—deep

Depth to a contrasting or impervious layer: Reeder—20 to 40 inches to soft sandstone; Rhoades—40 to more than 60 inches to shale

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Reeder—moderate; Rhoades—very slow

Available water capacity: Moderate

Organic matter content: Moderate

Surface runoff: Reeder—medium; Rhoades—slow

Inclusions*Contrasting inclusions:*

- Arnegard and Grail soils, which are dark to a depth of more than 16 inches and are on foot slopes
- Regent soils, which have more clay than the Reeder soil, do not have a sodium-affected subsoil, and are on back slopes
- Vebar soils, which have less clay in the subsoil than the Reeder and Rhoades soils, do not have a sodium-affected subsoil, and are on back slopes

Similar inclusions:

- Rhoades soils that have a thicker surface layer

Use and Management**Cropland and pasture***General management considerations:*

- The Rhoades soil is unsuited to cropland.

Main crops: Wheat, oats, and alfalfa in areas of the Reeder soil

Management concerns: Reeder—water erosion; Rhoades—water erosion, a sodium-affected subsoil that adversely affects crop growth by restricting root penetration, a slow rate of water intake

Management measures:

- Minimizing tillage and leaving crop residue on the

surface help to conserve moisture, control erosion, and maintain the content of organic matter.

- Timely tillage, chiseling or subsoiling, and including grasses and legumes in the cropping system improve tilth and increase the rate of water intake.

Interpretive Groups

Land capability classification: Reeder—Ile-1; Rhoades—VIs-1

Range site: Reeder—Silty; Rhoades—Thin Claypan

Windbreak suitability group: Reeder—6; Rhoades—10

Pasture suitability group: Reeder—F; Rhoades—C

RnA—Regent silty clay loam, 0 to 2 percent slopes**Composition**

Regent soil and similar inclusions: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Dissected plains

Landscape position: Back slopes

Slope range: 0 to 2 percent

Shape of areas: Irregular

Size of areas: 10 to 100 acres

Typical Profile*Surface layer:*

0 to 6 inches—dark grayish brown silty clay loam

Subsoil:

6 to 14 inches—dark grayish brown silty clay

14 to 22 inches—olive, calcareous silty clay loam

Underlying layer:

22 to 33 inches—olive gray, calcareous silty clay loam

33 to 60 inches—soft bedded shale

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Moderately deep

Depth to a contrasting or impervious layer: 20 to 40 inches to shale

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Slow

Available water capacity: Moderate

Organic matter content: Moderate

Surface runoff: Slow

Inclusions*Contrasting inclusions:*

- The sodium-affected Daglum soils on foot slopes
- Grail soils, which are dark to a depth of more than 16 inches and are on foot slopes

- The sodium-affected Rhoades soils on the lower foot slopes and toe slopes
- Savage soils, which have bedded shale below a depth of 40 inches and are in landscape positions similar to those of the Regent soil

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Moisture conservation

Management measures:

- Minimizing tillage and leaving crop residue on the surface help to conserve moisture and maintain tilth and the content of organic matter.

Interpretive Groups

Land capability classification: IIc-2

Range site: Clayey

Windbreak suitability group: 4

Pasture suitability group: F

RnB—Regent silty clay loam, 2 to 6 percent slopes

Composition

Regent soil and similar inclusions: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Dissected plains

Landscape position: Back slopes

Slope range: 2 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 200 acres

Typical Profile

Surface layer:

0 to 6 inches—dark grayish brown silty clay loam

Subsoil:

6 to 14 inches—dark grayish brown silty clay

14 to 22 inches—olive, calcareous silty clay loam

Underlying layer:

22 to 33 inches—olive gray, calcareous silty clay loam

33 to 60 inches—soft bedded shale

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Moderately deep

Depth to a contrasting or impervious layer: 20 to 40 inches to shale

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Slow

Available water capacity: Moderate

Organic matter content: Moderate

Surface runoff: Medium

Inclusions

Contrasting inclusions:

- The sodium-affected Daglum and Rhoades soils on foot slopes and toe slopes
- Grail soils, which are dark to a depth of more than 16 inches and are on foot slopes
- Reeder soils, which have less clay than the Regent soil and are in similar landscape positions
- Wayden soils, which have bedded shale within a depth of 20 inches and are higher on the landscape than the Regent soil

Similar inclusions:

- Soils that have less clay in the subsoil than the Regent soil

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Water erosion

Management measures:

- Minimizing tillage and leaving crop residue on the surface help to conserve moisture and maintain tilth and the content of organic matter.
- Contour farming and grassed waterways help to control water erosion.

Interpretive Groups

Land capability classification: IIe-1

Range site: Clayey

Windbreak suitability group: 4

Pasture suitability group: F

RpC—Regent-Wayden silty clay loams, 6 to 15 percent slopes

Composition

Regent soil and similar inclusions: 50 to 60 percent

Wayden soil and similar inclusions: 30 to 40 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Dissected plains

Landscape position: Regent—back slopes; Wayden—summits and shoulders

Slope range: Regent—6 to 9 percent; Wayden—9 to 15 percent

Shape of areas: Elongated or irregular

Size of areas: 10 to 125 acres

Typical Profile

Regent

Surface layer:

0 to 6 inches—dark grayish brown silty clay loam

Subsoil:

6 to 14 inches—dark grayish brown silty clay

14 to 22 inches—olive, calcareous silty clay loam

Underlying layer:

22 to 33 inches—olive gray, calcareous silty clay loam

33 to 60 inches—soft bedded shale

Wayden

Surface layer:

0 to 5 inches—grayish brown silty clay loam

Underlying layer:

5 to 18 inches—olive, calcareous silty clay loam

18 to 60 inches—bedded shale

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Regent—moderately deep; Wayden—shallow

Depth to a contrasting or impervious layer: Regent—20 to 40 inches to shale; Wayden—10 to 20 inches to shale

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Slow

Available water capacity: Regent—moderate; Wayden—very low

Organic matter content: Regent—moderate; Wayden—low

Surface runoff: Medium or rapid

Inclusions

Contrasting inclusions:

- Cabba and Cohagen soils, which have less clay throughout than the Regent and Wayden soils and are on shoulders
- The sodium-affected Daglum and Rhoades soils on foot slopes and toe slopes
- Grail soils, which are dark to a depth of more than 16 inches and are on foot slopes
- Reeder soils, which have less clay than the Regent and Wayden soils and are in landscape positions similar to those of the Regent soil

Similar inclusions:

- Regent soils that have less clay in the subsoil

Use and Management

Cropland and pasture

General management considerations:

- The Wayden soil is unsuited to cropland.

- Most of the acreage supports native grasses and is grazed.

Main crops: Wheat, oats, and alfalfa in areas of the

Regent soil

Management concerns: Regent—water erosion;

Wayden—wind erosion, water erosion, the very low available water capacity

Management measures:

- Minimizing tillage, leaving crop residue on the surface, stripcropping, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain tilth and the content of organic matter.
- Contour farming and grassed waterways help to control water erosion.

Interpretive Groups

Land capability classification: Regent—IIIe-1; Wayden—VIe-12

Range site: Regent—Clayey; Wayden—Shallow

Windbreak suitability group: Regent—4; Wayden—10

Pasture suitability group: Regent—F; Wayden—G

RrA—Rhoades loam, 0 to 6 percent slopes

Composition

Rhoades soil and similar inclusions: 80 to 90 percent

Contrasting inclusions: 10 to 20 percent

Setting

Landform: Plains

Landscape position: The lower foot slopes and toe slopes

Slope range: 0 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 600 acres

Typical Profile

Surface layer:

0 to 3 inches—dark grayish brown loam

Subsoil:

3 to 10 inches—grayish brown clay loam

10 to 25 inches—grayish brown, calcareous clay loam that has accumulations of salts

Underlying layer:

25 to 49 inches—grayish brown, calcareous clay loam that has accumulations of salts

49 to 60 inches—bedded shale

Soil Properties and Qualities

Drainage class: Well drained and moderately well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: 40 to more than 60 inches to shale

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Very slow

Available water capacity: Moderate

Organic matter content: Moderate

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- Havrelon soils, which do not have a sodium-affected subsoil and are on high flood plains
- Reeder, Regent, and Vebar soils, which do not have a sodium-affected subsoil and are higher on the landscape than the Rhoades soil
- Slickspots, which have salts at or near the surface and are in microlows on foot slopes and toe slopes

Similar inclusions:

- Soils that have a surface layer that is thicker than that of the Rhoades soil
- Soils that have less clay in the subsoil than the Rhoades soil

Use and Management

Cropland and pasture

General management considerations:

- The soil is unsuited to cropland.

Management concerns: A sodium-affected subsoil and a content of salts that adversely affect crop growth by restricting root penetration, a slow rate of water intake

Management measures:

- Proper grazing management helps to maintain plant vigor and conserve moisture.

Interpretive Groups

Land capability classification: VIs-1

Range site: Thin Claypan

Windbreak suitability group: 10

Pasture suitability group: C

RsB—Rhoades-Daglum loams, 0 to 9 percent slopes

Composition

Rhoades soil and similar inclusions: 45 to 60 percent

Daglum soil and similar inclusions: 30 to 40 percent

Contrasting inclusions: 5 to 20 percent

Setting

Landform: Plains

Landscape position: Rhoades—the lower foot slopes

and toe slopes; Daglum—the lower back slopes and foot slopes

Slope range: 0 to 9 percent

Shape of areas: Irregular

Size of areas: 10 to 250 acres

Typical Profile

Rhoades

Surface layer:

0 to 3 inches—dark grayish brown loam

Subsoil:

3 to 10 inches—grayish brown clay loam

10 to 25 inches—grayish brown, calcareous clay loam that has accumulations of salts

Underlying layer:

25 to 49 inches—grayish brown, calcareous clay loam that has accumulations of salts

49 to 60 inches—bedded shale

Daglum

Surface layer:

0 to 5 inches—dark grayish brown loam

Subsurface layer:

5 to 7 inches—light brownish gray loam

Subsoil:

7 to 16 inches—dark grayish brown clay

16 to 25 inches—grayish brown, calcareous clay that has accumulations of salts

Underlying layer:

25 to 36 inches—grayish brown, calcareous clay loam that has accumulations of salts

36 to 60 inches—light olive brown, calcareous clay loam

Soil Properties and Qualities

Drainage class: Rhoades—well drained and moderately well drained; Daglum—well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: 40 to more than 60 inches to shale

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Very slow

Available water capacity: Moderate

Organic matter content: Moderate

Surface runoff: Rhoades—slow; Daglum—medium

Inclusions

Contrasting inclusions:

- Arnegard soils, which do not have a sodium-affected subsoil and are on foot slopes
- The well drained Havrelon and poorly drained, saline Lallie soils, which do not have a sodium-affected subsoil and are on flood plains
- Reeder, Regent, and Vebar soils, which do not have a

sodium-affected subsoil and are higher on the landscape than the Rhoades and Daglum soils

- Slickspots, which have salts at or near the surface and are in microlows on foot slopes and toe slopes

Similar inclusions:

- Soils that have less clay in the subsoil than the Rhoades and Daglum soils
- Rhoades soils that have bedrock at a depth of less than 40 inches
- Daglum soils that have bedrock at a depth of more than 30 inches

Use and Management

Cropland and pasture

General management considerations:

- The Rhoades soil is unsuited to cropland.
- Most of the acreage supports native grasses and is grazed.

Management concerns: A sodium-affected subsoil and a content of salts that adversely affect crop growth by restricting root penetration, a slow rate of water intake

Management measures:

- Proper grazing management helps to maintain plant vigor and conserve moisture.

Interpretive Groups

Land capability classification: Rhoades—VIs-1; Daglum—IVs-3

Range site: Rhoades—Thin Claypan; Daglum—Claypan

Windbreak suitability group: Rhoades—10; Daglum—9

Pasture suitability group: C

RtB—Rhoades-Daglum-Slickspots complex, 0 to 9 percent slopes

Composition

Rhoades soil and similar inclusions: 40 to 50 percent

Daglum soil and similar inclusions: 30 to 40 percent

Slickspots and similar inclusions: 15 to 35 percent

Contrasting inclusions: 5 to 20 percent

Setting

Landform: Plains

Landscape position: Rhoades—the lower foot slopes and toe slopes; Daglum—the lower back slopes and foot slopes; Slickspots—microlows on foot slopes and toe slopes

Slope range: Rhoades and Daglum—0 to 9 percent; Slickspots—0 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 600 acres

Typical Profile

Rhoades

Surface layer:

0 to 3 inches—dark grayish brown loam

Subsoil:

3 to 10 inches—grayish brown clay loam

10 to 25 inches—grayish brown, calcareous clay loam that has accumulations of salts

Underlying layer:

25 to 49 inches—grayish brown, calcareous clay loam that has accumulations of salts

49 to 60 inches—bedded shale

Daglum

Surface layer:

0 to 5 inches—dark grayish brown loam

Subsurface layer:

5 to 7 inches—light brownish gray loam

Subsoil:

7 to 16 inches—dark grayish brown clay

16 to 25 inches—grayish brown, calcareous clay that has accumulations of salts

Underlying layer:

25 to 36 inches—grayish brown, calcareous clay loam that has accumulations of salts

36 to 60 inches—light olive brown, calcareous clay loam

Slickspots

• Slickspots have a light gray, dispersed surface crust and dense, massive underlying material.

• Accumulations of visible salts are at or near the surface.

• Slickspots are barren or nearly barren of vegetation.

Soil Properties and Qualities

Drainage class: Rhoades—well drained and moderately well drained; Daglum—well drained; Slickspots—moderately well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: 40 to more than 60 inches to shale

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Very slow

Available water capacity: Rhoades and Daglum—moderate; Slickspots—low

Organic matter content: Rhoades and Daglum—moderate; Slickspots—moderately low

Surface runoff: Rhoades and Daglum—medium; Slickspots—slow

Inclusions

Contrasting inclusions:

- Arnegard soils, which do not have a sodium-affected

subsoil and are on foot slopes

- The well drained Havrelon soils, which do not have a sodium-affected subsoil and are on high flood plains
- The poorly drained, saline Lallie soils, which do not have a sodium-affected subsoil and are on low flood plains
- Reeder, Regent, and Vebar soils, which do not have a sodium-affected subsoil and are higher on the landscape than the Rhoades and Daglum soils

Similar inclusions:

- Soils that have less clay in the subsoil than the Rhoades and Daglum soils
- Rhoades soils that have bedrock at a depth of less than 40 inches
- Daglum soils that have bedrock at a depth of more than 30 inches

Use and Management

Cropland and pasture

General management considerations:

- The soils are unsuited to cropland.
- Most of the acreage supports native grasses and is grazed.

Management concerns: Rhoades and Daglum—a sodium-affected subsoil that adversely affects crop growth by restricting root penetration, a slow rate of water intake; Slickspots—content of salts

Management measures:

- Proper grazing management helps to maintain plant vigor and conserve moisture.

Interpretive Groups

Land capability classification: Rhoades—VIs-1;

Daglum—IVs-3; Slickspots—Vllls-3

Range site: Rhoades—Thin Claypan; Daglum—Claypan; Slickspots—none assigned

Windbreak suitability group: Rhoades and Slickspots—10; Daglum—9

Pasture suitability group: Rhoades and Daglum—C; Slickspots—NS

RuB—Rhoades-Slickspots complex, 0 to 6 percent slopes

Composition

Rhoades soil and similar inclusions: 40 to 70 percent

Slickspots and similar inclusions: 30 to 50 percent

Contrasting inclusions: 5 to 20 percent

Setting

Landform: Plains

Landscape position: Rhoades—the lower foot slopes and toe slopes; Slickspots—microlows on foot slopes and toe slopes (fig. 9)

Slope range: 0 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 800 acres

Typical Profile

Rhoades

Surface layer:

0 to 3 inches—dark grayish brown loam

Subsoil:

3 to 10 inches—grayish brown clay loam

10 to 25 inches—grayish brown, calcareous clay loam that has accumulations of salts

Underlying layer:

25 to 49 inches—grayish brown, calcareous clay loam that has accumulations of salts

49 to 60 inches—bedded shale

Slickspots

- Slickspots have a light gray, dispersed surface crust and dense, massive underlying material.
- Accumulations of visible salts are at or near the surface.
- Slickspots are barren or nearly barren of vegetation.

Soil Properties and Qualities

Drainage class: Rhoades—well drained and moderately well drained; Slickspots—moderately well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: 40 to more than 60 inches to shale

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Very slow

Available water capacity: Rhoades—moderate; Slickspots—low

Organic matter content: Rhoades—moderate; Slickspots—moderately low

Surface runoff: Rhoades—medium; Slickspots—slow

Inclusions

Contrasting inclusions:

- Havrelon soils, which do not have a sodium-affected subsoil and are on high flood plains
- Reeder, Regent, and Vebar soils, which do not have a sodium-affected subsoil, have bedded shale at a depth of 20 to 40 inches, and are higher on the landscape than the Rhoades soil
- Areas of Rock outcrop, which include exposures of bedrock and are on shoulders and back slopes

Similar inclusions:

- Soils that have a surface layer that is thicker than that of the Rhoades soil
- Soils that have less clay in the subsoil than the Rhoades soil



Figure 9.—An area of Rhoades-Slickspots complex, 0 to 6 percent slopes. The Rhoades soil is in vegetated areas, and the Slickspots are in barren areas. An area of Reeder-Cabba loams, 3 to 6 percent slopes, is in the higher landscape positions in the background.

Use and Management

Cropland and pasture

General management considerations:

- Areas of this map unit are unsuited to cropland.

Management concerns: Rhoades—a sodium-affected subsoil that adversely affects crop growth by restricting root penetration, a slow rate of water intake; Slickspots—content of salts

Management measures:

- Proper grazing management helps to maintain plant vigor and conserve moisture.

Interpretive Groups

Land capability classification: Rhoades—VIs-1; Slickspots—VllIs-3

Range site: Rhoades—Thin Claypan; Slickspots—none assigned

Windbreak suitability group: 10

Pasture suitability group: Rhoades—C; Slickspots—NS

RvE—Rhoades-Slickspots-Rock outcrop complex, 0 to 40 percent slopes

Composition

Rhoades soil and similar inclusions: 40 to 60 percent

Slickspots and similar inclusions: 30 to 45 percent

Rock outcrop and similar inclusions: 20 to 35 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Dissected plains

Landscape position: Rhoades—the lower foot slopes and toe slopes; Slickspots—microlows on foot slopes and toe slopes; Rock outcrop—shoulders and back slopes

Slope range: Rhoades—0 to 9 percent; Slickspots—0 to 6 percent; Rock outcrop—0 to 40 percent

Shape of areas: Irregular

Size of areas: 10 to 300 acres

Typical Profile

Rhoades

Surface layer:

0 to 3 inches—dark grayish brown loam

Subsoil:

3 to 10 inches—grayish brown clay loam

10 to 25 inches—grayish brown, calcareous clay loam that has accumulations of salts

Underlying layer:

25 to 49 inches—grayish brown, calcareous clay loam that has accumulations of salts

49 to 60 inches—bedded shale

Slickspots

- Slickspots have a light gray, dispersed surface crust and dense, massive underlying material.

- Accumulations of visible salts are at or near the surface.

- Slickspots are barren or nearly barren of vegetation.

Rock outcrop

- Rock outcrop consists of eroding exposures of soft bedrock.

- Rock outcrop is barren of vegetation.

Soil Properties and Qualities

Drainage class: Rhoades—well drained and moderately well drained; Slickspots—moderately well drained

Depth to bedrock: Rhoades and Slickspots—deep

Depth to a contrasting or impervious layer: Rhoades and Slickspots—40 to more than 60 inches to shale;

Rock outcrop—soft bedrock at the surface

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Rhoades and Slickspots—very slow

Available water capacity: Rhoades—moderate;

Slickspots—low

Organic matter content: Rhoades—moderate;

Slickspots—moderately low

Surface runoff: Rhoades—medium; Slickspots—slow;

Rock outcrop—very rapid

Inclusions

Contrasting inclusions:

- Belfield soils, which do not have salts within a depth of 16 inches and are on the lower back slopes and foot slopes

- Cabba soils, which do not have a sodium-affected subsoil and are on shoulders

- Havrelon soils, which do not have a sodium-affected subsoil and are on high flood plains

- Trembles soils, which do not have a sodium-affected subsoil and are on high terraces

Similar inclusions:

- Soils that have a surface layer that is thicker than that of the Rhoades soil

- Soils that have less clay in the subsoil than the Rhoades soil

- Areas of Rock outcrop that have 1 to 5 inches of weathered material on the surface

Use and Management

Cropland and pasture

General management considerations:

- Areas of this map unit are unsuited to cropland.

Management concerns: Rhoades—a sodium-affected subsoil that adversely affects crop growth by restricting root penetration, a slow rate of water intake; Slickspots—content of salts; Rock outcrop—exposed areas of bedrock

Management measures:

- Proper grazing management helps to maintain plant vigor and conserve moisture.

Interpretive Groups

Land capability classification: Rhoades—VIs-1;

Slickspots—VIIs-3; Rock outcrop—VIIs-1

Range site: Rhoades—Thin Claypan; Slickspots and

Rock outcrop—none assigned

Windbreak suitability group: 10

Pasture suitability group: Rhoades—C; Slickspots and Rock outcrop—NS



Figure 10.—An area of Rock outcrop-Cabba complex, 6 to 40 percent slopes. The Rock outcrop is in barren areas, and the Cabba soil is in vegetated areas.

RzF—Rock outcrop-Cabba complex, 6 to 40 percent slopes

Composition

Rock outcrop and similar inclusions: 60 to 75 percent

Cabba soil and similar inclusions: 25 to 40 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landform: Dissected plains

Landscape position: Rock outcrop—summits and shoulders; Cabba—shoulders and the upper back slopes (fig. 10)

Slope range: 6 to 40 percent

Shape of areas: Irregular

Size of areas: 10 to 650 acres

Typical Profile

Rock outcrop

- Rock outcrop consists of eroding exposures of soft bedrock.
- Rock outcrop is barren of vegetation.

Cabba

Surface layer:

0 to 4 inches—dark grayish brown loam

Underlying layer:

4 to 10 inches—grayish brown, calcareous loam

10 to 32 inches—grayish brown, weakly cemented sandstone

32 to 60 inches—soft siltstone

Soil Properties and Qualities

Drainage class: Cabba—well drained

Depth to bedrock: Cabba—shallow

Depth to a contrasting or impervious layer: Rock outcrop—soft bedrock at the surface; Cabba—10 to 20 inches to soft sandstone and siltstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Cabba—moderate

Available water capacity: Cabba—very low

Organic matter content: Cabba—low

Surface runoff: Rock outcrop—very rapid; Cabba—rapid

Inclusions

Contrasting inclusions:

- Cohagen soils, which have less clay than the Cabba soil and are in the higher grassed areas
- Wayden soils, which have more clay than the Cabba soil and are in the higher grassed areas
- The sodium-affected Daglum and Rhoades soils on foot slopes and toe slopes
- Reeder and Regent soils, which have siltstone at a depth of 20 to 40 inches and are on back slopes

Use and Management

Cropland and pasture

General management considerations:

- Areas of this map unit are unsuited to cropland.
- Because areas of the Cabba soil generally are small and inaccessible, this soil is limited for grazing.
- Most areas are used for range and as wildlife habitat.

Management concerns: Cabba—water erosion, the very low available water capacity, the slope; Rock outcrop—exposed areas of hard bedrock

Management measures:

- Proper grazing management helps to maintain plant vigor, conserve moisture, and control erosion.

Interpretive Groups

Land capability classification: Rock outcrop—VIIIs-1; Cabba—VIIe-7

Range site: Rock outcrop—none assigned; Cabba—Shallow

Windbreak suitability group: 10

Pasture suitability group: NS

SbE—Sansarc-Opal clays, 15 to 40 percent slopes

Composition

Sansarc soil and similar inclusions: 55 to 65 percent

Opal soil and similar inclusions: 25 to 35 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Dissected plains

Landscape position: Sansarc—shoulders and the upper back slopes; Opal—back slopes

Slope range: Sansarc—25 to 40 percent; Opal—15 to 40 percent

Shape of areas: Irregular

Size of areas: 10 to 1,000 acres

Typical Profile

Sansarc

Surface layer:

0 to 4 inches—grayish brown, calcareous clay

Subsurface layer:

4 to 10 inches—grayish brown, calcareous clay

Underlying layer:

10 to 16 inches—grayish brown, calcareous clay

16 to 60 inches—bedded shale

Opal

Surface layer:

0 to 4 inches—dark grayish brown clay

Subsoil:

4 to 16 inches—dark grayish brown, calcareous clay

16 to 22 inches—grayish brown, calcareous clay

Underlying layer:

22 to 36 inches—light brownish gray, calcareous clay

36 to 60 inches—bedded shale

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Sansarc—shallow; Opal—moderately deep

Depth to a contrasting or impervious layer: Sansarc—6 to 20 inches to shale; Opal—20 to 40 inches to shale

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Very slow

Available water capacity: Sansarc—very low; Opal—low

Organic matter content: Sansarc—moderately low; Opal—moderate

Surface runoff: Rapid

Inclusions

Contrasting inclusions:

- Bryant soils, which have less clay than the Sansarc and Opal soils and are on summits and back slopes
- The sodium-affected Hurley soils on the lower foot slopes
- Wabek soils, which have sand and gravel at a depth of 7 to 14 inches and are on isolated shoulders

Similar inclusions:

- Soils that do not have free carbonates
- Sansarc soils that are very firm or extremely firm

- Sansarc soils that have shale at a depth of less than 10 inches

Use and Management

Cropland and pasture

General management considerations:

- The soils are unsuited to cropland.

Management concerns: Wind erosion, water erosion, the very low available water capacity in the Sansarc soil, the low available water capacity in the Opal soil, a slow rate of water intake, the slope

Management measures:

- Proper grazing management helps to maintain plant vigor, conserve moisture, and control erosion.

Interpretive Groups

Land capability classification: VIIe-8

Range site: Sansarc—Shallow Clay; Opal—Clayey

Windbreak suitability group: 10

Pasture suitability group: NS

SdD—Sansarc-Opal-Dupree clays, 9 to 25 percent slopes

Composition

Sansarc soil and similar inclusions: 40 to 50 percent

Opal soil and similar inclusions: 30 to 45 percent

Dupree soil and similar inclusions: 20 to 35 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Dissected plains

Landscape position: Sansarc—shoulders and the upper back slopes; Opal—back slopes; Dupree—the lower back slopes and foot slopes

Slope range: 9 to 25 percent

Shape of areas: Irregular

Size of areas: 10 to 500 acres

Typical Profile

Sansarc

Surface layer:

0 to 4 inches—grayish brown, calcareous clay

Subsurface layer:

4 to 10 inches—grayish brown, calcareous clay

Underlying layer:

10 to 16 inches—grayish brown, calcareous clay

16 to 60 inches—bedded shale

Opal

Surface layer:

0 to 4 inches—dark grayish brown clay

Subsoil:

4 to 16 inches—dark grayish brown, calcareous clay

16 to 22 inches—grayish brown, calcareous clay

Underlying layer:

22 to 36 inches—light brownish gray, calcareous clay

36 to 60 inches—bedded shale

Dupree

Surface layer:

0 to 3 inches—gray clay

Subsoil:

3 to 15 inches—gray and grayish brown clay

Underlying layer:

15 to 60 inches—bedded shale

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Sansarc and Dupree—shallow;

Opal—moderately deep

Depth to a contrasting or impervious layer: Sansarc—6

to 20 inches to shale; Opal—20 to 40 inches to

shale; Dupree—10 to 20 inches to shale

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Very slow

Available water capacity: Sansarc and Dupree—very low; Opal—low

Organic matter content: Sansarc and Dupree—moderately low; Opal—moderate

Surface runoff: Medium

Inclusions

Contrasting inclusions:

- Bryant soils, which have less clay than the Sansarc and Opal soils and are on summits and back slopes
- The sodium-affected Hurley soils on the lower foot slopes

Similar inclusions:

- Soils that do not have free carbonates
- Sansarc soils that are very firm or extremely firm
- Sansarc soils that have shale at a depth of less than 10 inches

Use and Management

Cropland and pasture

General management considerations:

- The soils are unsuited to cropland.

Management concerns: Wind erosion, water erosion, the very low available water capacity in the Sansarc and Dupree soils, the low available water capacity in the Opal soil, a slow rate of water intake

Management measures:

- Proper grazing management helps to maintain plant vigor, conserve moisture, and control erosion.

Interpretive Groups

Land capability classification: Vle-12

Range site: Sansarc—Shallow Clay; Opal—Clayey;

Dupree—Dense Clay

Windbreak suitability group: 10

Pasture suitability group: NS

SeE—Sansarc-Wabek complex, 15 to 40 percent slopes

Composition

Sansarc soil and similar inclusions: 50 to 60 percent

Wabek soil and similar inclusions: 35 to 45 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landform: Dissected plains

Landscape position: Sansarc—shoulders and the upper back slopes; Wabek—summits and shoulders

Slope range: Sansarc—15 to 40 percent; Wabek—15 to 35 percent

Shape of areas: Long and narrow or irregular

Size of areas: 10 to 500 acres

Typical Profile

Sansarc

Surface layer:

0 to 4 inches—grayish brown, calcareous clay

Subsurface layer:

4 to 10 inches—grayish brown, calcareous clay

Underlying layer:

10 to 16 inches—grayish brown, calcareous clay

16 to 60 inches—bedded shale

Wabek

Surface layer:

0 to 8 inches—dark grayish brown gravelly sandy loam

Underlying layer:

8 to 12 inches—multicolored, calcareous gravelly coarse sand

12 to 60 inches—multicolored, calcareous very gravelly sand

Soil Properties and Qualities

Drainage class: Sansarc—well drained; Wabek—excessively drained

Depth to bedrock: Sansarc—shallow; Wabek—deep

Depth to a contrasting or impervious layer: Sansarc—6 to 20 inches to shale; Wabek—7 to 14 inches to sand and gravel

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Sansarc—very slow; Wabek—very rapid

Available water capacity: Very low

Organic matter content: Moderately low

Surface runoff: Sansarc—rapid; Wabek—medium

Inclusions

Contrasting inclusions:

- Farnuf and Shambo soils, which do not have bedrock within a depth of 40 inches and are on the lower back slopes and foot slopes

- Lehr and Stady soils, which are deeper to sand and gravel than the Wabek soil and are on back slopes and foot slopes

- Opal soils, which have bedded shale at a depth of 20 to 40 inches and are on back slopes

Similar inclusions:

- Sansarc soils that do not have free carbonates

- Sansarc soils that are very firm or extremely firm

- Sansarc soils that have shale at a depth of less than 10 inches

Use and Management

Cropland and pasture

General management considerations:

- The soils are unsuited to cropland.

Management concerns: Sansarc—wind erosion, water erosion, the very low available water capacity, a slow rate of water intake; Wabek—water erosion, the very low available water capacity

Management measures:

- Proper grazing management helps to maintain plant vigor, conserve moisture, and control erosion.

Interpretive Groups

Land capability classification: Sansarc—Vlle-8; Wabek—Vlls-4

Range site: Sansarc—Shallow Clay; Wabek—Very Shallow

Windbreak suitability group: 10

Pasture suitability group: NS

SgA—Savage silt loam, 0 to 3 percent slopes

Composition

Savage soil and similar inclusions: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Fans and terraces

Landscape position: Foot slopes

Slope range: 0 to 3 percent

Shape of areas: Irregular

Size of areas: 10 to 150 acres

Typical Profile

Surface layer:

0 to 7 inches—dark grayish brown silt loam

Subsoil:

7 to 11 inches—grayish brown silty clay loam

11 to 21 inches—grayish brown silty clay

21 to 29 inches—grayish brown, calcareous silty clay

Underlying layer:

29 to 60 inches—grayish brown, calcareous silty clay loam

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Slow

Available water capacity: Moderate

Organic matter content: Moderate

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- Arnegard soils, which are dark to a depth of more than 16 inches and are on foot slopes
- The sodium-affected Belfield, Daglum, and Rhoades soils on foot slopes and toe slopes

Similar inclusions:

- Soils that have a surface layer that is thicker and darker than that of the Savage soil

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Moisture conservation

Management measures:

- Minimizing tillage and leaving crop residue on the surface help to conserve moisture and maintain tilth and the content of organic matter.

Interpretive Groups

Land capability classification: IIc-2

Range site: Clayey

Windbreak suitability group: 3

Pasture suitability group: F

SgB—Savage silt loam, 3 to 6 percent slopes

Composition

Savage soil and similar inclusions: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Fans and terraces

Landscape position: Foot slopes

Slope range: 0 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 200 acres

Typical Profile

Surface layer:

0 to 7 inches—dark grayish brown silt loam

Subsoil:

7 to 11 inches—grayish brown silty clay loam

11 to 21 inches—grayish brown silty clay

21 to 29 inches—grayish brown, calcareous silty clay

Underlying layer:

29 to 60 inches—grayish brown, calcareous silty clay loam

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Slow

Available water capacity: Moderate

Organic matter content: Moderate

Surface runoff: Medium

Inclusions

Contrasting inclusions:

- Arnegard soils, which are dark to a depth of more than 16 inches and are on foot slopes
- The sodium-affected Belfield, Daglum, and Rhoades soils on foot slopes and toe slopes

Similar inclusions:

- Soils that have a surface layer that is thicker and darker than that of the Savage soil

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Water erosion

Management measures:

- Minimizing tillage, leaving crop residue on the surface, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain tilth and the content of organic matter.
- Contour farming and grassed waterways help to control water erosion.

Interpretive Groups

Land capability classification: IIe-1

Range site: Clayey

Windbreak suitability group: 3

Pasture suitability group: F

ShA—Shambo loam, 0 to 2 percent slopes

Composition

Shambo soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landform: Terraces

Landscape position: The lower back slopes and foot slopes

Slope range: 0 to 2 percent

Shape of areas: Long and narrow or irregular

Size of areas: 15 to 200 acres

Typical Profile

Surface layer:

0 to 7 inches—dark grayish brown loam

Subsoil:

7 to 18 inches—brown and olive brown loam

18 to 34 inches—grayish brown, calcareous loam

Underlying layer:

34 to 60 inches—grayish brown, calcareous loam that is stratified in the lower part

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderate

Available water capacity: High

Organic matter content: Moderate

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- Arnegard soils, which are dark to a depth of more than 16 inches and are on foot slopes
- The sodium-affected Daglum and Rhoades soils on foot slopes and toe slopes
- Stady soils, which have sand and gravel at a depth of 20 to 40 inches and are on back slopes
- Vebar soils, which have less clay than the Shambo soil and are on the lower back slopes and foot slopes

Similar inclusions:

- Soils that have more clay in the subsoil than the Shambo soil

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Moisture conservation

Management measures:

- Minimizing tillage and leaving crop residue on the surface help to conserve moisture and maintain tilth and the content of organic matter.

Interpretive Groups

Land capability classification: 11c-2

Range site: Silty

Windbreak suitability group: 3

Pasture suitability group: F

ShB—Shambo loam, 2 to 6 percent slopes

Composition

Shambo soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landform: Terraces

Landscape position: The lower back slopes and foot slopes

Slope range: 2 to 6 percent

Shape of areas: Long and narrow or irregular

Size of areas: 15 to 200 acres

Typical Profile

Surface layer:

0 to 7 inches—dark grayish brown loam

Subsoil:

7 to 18 inches—brown and olive brown loam

18 to 34 inches—grayish brown, calcareous loam

Underlying layer:

34 to 60 inches—grayish brown, calcareous loam that is stratified in the lower part

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderate

Available water capacity: High

Organic matter content: Moderate

Surface runoff: Medium

Inclusions

Contrasting inclusions:

- Arnegard soils, which are dark to a depth of more than

16 inches and are on foot slopes

- The sodium-affected Daglum and Rhoades soils on foot slopes and toe slopes
- Stady soils, which have sand and gravel at a depth of 20 to 40 inches and are on back slopes
- Vebar soils, which have less clay than the Shambo soil and are on the lower back slopes and foot slopes

Similar inclusions:

- Soils that have more clay in the subsoil than the Shambo soil

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Water erosion

Management measures:

- Minimizing tillage, leaving crop residue on the surface, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain tilth and the content of organic matter.
- Contour farming and grassed waterways help to control water erosion.

Interpretive Groups

Land capability classification: IIe-1

Range site: Silty

Windbreak suitability group: 3

Pasture suitability group: F

ShC—Shambo loam, 6 to 9 percent slopes

Composition

Shambo soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Terraces

Landscape position: Back slopes and foot slopes

Slope range: 6 to 9 percent

Shape of areas: Irregular

Size of areas: 5 to 100 acres

Typical Profile

Surface layer:

0 to 7 inches—dark grayish brown loam

Subsoil:

7 to 18 inches—brown and olive brown loam

18 to 34 inches—grayish brown, calcareous loam

Underlying layer:

34 to 60 inches—grayish brown, calcareous loam that is stratified in the lower part

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderate

Available water capacity: High

Organic matter content: Moderate

Surface runoff: Medium

Inclusions

Contrasting inclusions:

- Amor and Vebar soils, which have bedrock within a depth of 40 inches and are higher on the landscape than the Shambo soil
- The sodium-affected Daglum soils on foot slopes

Similar inclusions:

- Soils that have more clay in the subsoil than the Shambo soil

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Water erosion

Management measures:

- Minimizing tillage, leaving crop residue on the surface, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain tilth and the content of organic matter.
- Contour farming, terraces, and grassed waterways help to control erosion.

Interpretive Groups

Land capability classification: IIIe-1

Range site: Silty

Windbreak suitability group: 3

Pasture suitability group: F

StA—Stady loam, 0 to 2 percent slopes

Composition

Stady soil and similar inclusions: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Terraces

Landscape position: Back slopes and foot slopes

Slope range: 0 to 2 percent

Shape of areas: Irregular

Size of areas: 10 to 125 acres

Typical Profile

Surface layer:

0 to 5 inches—dark grayish brown loam

Subsoil:

5 to 15 inches—dark brown loam

15 to 23 inches—grayish brown, calcareous loam

Underlying layer:

23 to 60 inches—dark brown, calcareous gravelly sand

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: 20 to 40 inches to sand and gravel

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderate in the subsoil and very rapid in the underlying gravelly sand

Available water capacity: Low

Organic matter content: Moderate

Surface runoff: Slow

Inclusions*Contrasting inclusions:*

- Arnegard soils, which do not have sand and gravel within a depth of 40 inches and are on foot slopes
- The sodium-affected Daglum and Rhoades soils on foot slopes and toe slopes
- Farnuf and Shambo soils, which do not have sand and gravel within a depth of 40 inches and are in landscape positions similar to those of the Stady soil

Similar inclusions:

- Soils that are dark at a depth of more than 16 inches
- Soils that have sand and gravel within a depth of 20 inches

Use and Management**Cropland and pasture**

Main crops: Wheat, oats, and alfalfa

Management concerns: The low available water capacity

Management measures:

- Minimizing tillage and leaving crop residue on the surface help to conserve moisture and maintain the content of organic matter.

Interpretive Groups

Land capability classification: IIIs-2

Range site: Silty

Windbreak suitability group: 6

Pasture suitability group: D1

StB—Stady loam, 2 to 6 percent slopes**Composition**

Stady soil and similar inclusions: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Terraces

Landscape position: Back slopes and foot slopes

Slope range: 2 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 80 acres

Typical Profile*Surface layer:*

0 to 5 inches—dark grayish brown loam

Subsoil:

5 to 15 inches—dark brown loam

15 to 23 inches—grayish brown, calcareous loam

Underlying layer:

23 to 60 inches—dark brown, calcareous gravelly sand

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: 20 to 40 inches to sand and gravel

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderate in the subsoil and very rapid in the underlying gravelly sand

Available water capacity: Low

Organic matter content: Moderate

Surface runoff: Slow

Inclusions*Contrasting inclusions:*

- Arnegard soils, which do not have sand and gravel within a depth of 40 inches and are on foot slopes
- The sodium-affected Daglum and Rhoades soils on foot slopes and toe slopes
- Farnuf and Shambo soils, which do not have sand and gravel within a depth of 40 inches and are in landscape positions similar to those of the Stady soil
- Wabek soils, which have sand and gravel at a depth of 7 to 14 inches and are on shoulders

Similar inclusions:

- Soils that are dark at a depth of more than 16 inches
- Soils that have sand and gravel within a depth of 20 inches

Use and Management**Cropland and pasture**

Main crops: Wheat, oats, and alfalfa

Management concerns: Water erosion, the low available water capacity

Management measures:

- Minimizing tillage and leaving crop residue on the surface help to conserve moisture, control erosion, and maintain the content of organic matter.

Interpretive Groups

Land capability classification: IIIe-6

Range site: Silty

Windbreak suitability group: 6

Pasture suitability group: D1

TaA—Tally fine sandy loam, 0 to 6 percent slopes

Composition

Tally soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Plains

Landscape position: Back slopes and the upper foot slopes

Slope range: 0 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 75 acres

Typical Profile

Surface layer:

0 to 7 inches—dark grayish brown fine sandy loam

Subsoil:

7 to 15 inches—dark grayish brown fine sandy loam

15 to 29 inches—grayish brown fine sandy loam

Underlying layer:

29 to 60 inches—multicolored, calcareous fine sand

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderately rapid

Available water capacity: Moderate

Organic matter content: Moderate

Surface runoff: Medium

Inclusions

Contrasting inclusions:

- The sodium-affected Ekalaka soils on foot slopes
- Parshall soils, which are dark to a depth of more than 16 inches and are on foot slopes
- Reeder soils, which have more clay in the subsoil than the Tally soil and are on back slopes
- Vebar soils, which have bedrock at a depth of less than 40 inches and are on back slopes

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Wind erosion

Management measures:

- Minimizing tillage, leaving crop residue on the surface, stripcropping, establishing field windbreaks, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain the content of organic matter.

Interpretive Groups

Land capability classification: IIIe-8

Range site: Sandy

Windbreak suitability group: 5

Pasture suitability group: H

TdA—Telfer loamy sand, 0 to 6 percent slopes

Composition

Telfer soil and similar inclusions: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Plains

Landscape position: Shoulders and the upper back slopes

Slope range: 0 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 200 acres

Typical Profile

Surface layer:

0 to 11 inches—dark grayish brown and dark brown loamy sand

Underlying layer:

11 to 60 inches—yellowish brown and light olive brown loamy sand

Soil Properties and Qualities

Drainage class: Somewhat excessively drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Rapid

Available water capacity: Low

Organic matter content: Low

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- The sodium-affected Bullock, Evridge, Ekalaka, and Parchin soils on foot slopes
- Vebar soils, which have soft sandstone at a depth of 20 to 40 inches and are on foot slopes

Similar inclusions:

- Soils that have soft sandstone at a depth of 40 to 60 inches
- Telfer soils that have soft bedrock at a depth of 30 to 40 inches and are in similar landscape positions

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Wind erosion, the low available water capacity

Management measures:

- Minimizing tillage, leaving crop residue on the surface, stripcropping, establishing field windbreaks, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain the content of organic matter.

Interpretive Groups

Land capability classification: IVe-9

Range site: Sands

Windbreak suitability group: 5

Pasture suitability group: H

TeB—Telfer-Ekalaka complex, 0 to 6 percent slopes

Composition

Telfer soil and similar inclusions: 50 to 60 percent

Ekalaka soil and similar inclusions: 30 to 45 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Plains

Landscape position: Telfer—shoulders and the upper back slopes; Ekalaka—foot slopes

Slope range: Telfer—0 to 6 percent; Ekalaka—3 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 75 acres

Typical Profile

Telfer

Surface layer:

0 to 11 inches—dark grayish brown and dark brown loamy sand

Underlying layer:

11 to 60 inches—yellowish brown and light olive brown loamy sand

Ekalaka

Surface layer:

0 to 13 inches—dark grayish brown very fine sandy loam

Subsurface layer:

13 to 19 inches—grayish brown very fine sandy loam

Subsoil:

19 to 26 inches—light olive brown fine sandy loam

26 to 45 inches—light olive brown, calcareous fine sandy loam that has accumulations of salts

Underlying layer:

45 to 60 inches—soft, weakly cemented sandstone

Soil Properties and Qualities

Drainage class: Telfer—somewhat excessively drained; Ekalaka—well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: Telfer—more than 60 inches; Ekalaka—40 to more than 60 inches to soft sandstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Telfer—rapid; Ekalaka—slow

Available water capacity: Telfer—low; Ekalaka—moderate

Organic matter content: Telfer—low; Ekalaka—moderate

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- Bullock and Parchin soils, which have more clay in the subsoil than the Telfer and Ekalaka soils and are on foot slopes and the upper toe slopes
- Slickspots, which have salts at or near the surface and are in microlows on foot slopes and toe slopes

Similar inclusions:

- Telfer soils that have soft sandstone at a depth of 40 to 60 inches
- Ekalaka soils that have a thicker surface layer
- Ekalaka soils that have bedrock within a depth of 40 inches

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Telfer—wind erosion, the low available water capacity; Ekalaka—wind erosion, a sodium-affected subsoil that adversely affects crop growth by restricting root penetration, a slow rate of water intake

Management measures:

- Minimizing tillage, leaving crop residue on the surface, stripcropping, establishing field windbreaks, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain the content of organic matter.

Interpretive Groups

Land capability classification: Telfer—IVe-9; Ekalaka—IVe-13

Range site: Telfer—Sands; Ekalaka—Sandy

Windbreak suitability group: 5

Pasture suitability group: H

Th—Trembles fine sandy loam**Composition**

Trembles soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Flood plains

Landscape position: High flood plains

Slope range: 0 to 2 percent

Shape of areas: Elongated or irregular

Size of areas: 15 to 100 acres

Typical Profile*Surface layer:*

0 to 9 inches—grayish brown fine sandy loam

Underlying layer:

9 to 39 inches—grayish brown, calcareous fine sandy loam that is stratified with thin lenses of silt and fine sand

39 to 60 inches—grayish brown, calcareous loamy fine sand that is stratified with thin lenses of fine sand and silt

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: Rare

Permeability: Moderately rapid

Available water capacity: Moderate

Organic matter content: Moderately low

Surface runoff: Slow

Inclusions*Contrasting inclusions:*

- Banks soils, which have more sand than the Trembles soil and are on low flood plains
- Havrelon soils, which have more clay than the

Trembles soil and are on high flood plains

Similar inclusions:

- Soils that are leached of free carbonates to a depth of more than 40 inches

Use and Management**Cropland and pasture***General management considerations:*

- Most of the acreage is used as hayland.

Management concerns: Wind erosion

Management measures:

- Minimizing tillage, leaving crop residue on the surface, stripcropping, establishing field windbreaks, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain the content of organic matter.

Interpretive Groups

Land capability classification: IIIe-7

Range site: Loamy Overflow

Windbreak suitability group: 1

Pasture suitability group: H

Tm—Trembles fine sandy loam, channeled**Composition**

Trembles soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Flood plains

Landscape position: High flood plains

Slope range: 0 to 4 percent

Shape of areas: Long and narrow

Size of areas: 30 to 450 acres

Typical Profile*Surface layer:*

0 to 9 inches—grayish brown fine sandy loam

Underlying layer:

9 to 39 inches—grayish brown, calcareous fine sandy loam that is stratified with thin lenses of silt and fine sand

39 to 60 inches—grayish brown, calcareous loamy fine sand that is stratified with thin lenses of fine sand and silt

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: Frequency—occasional; duration—brief

Permeability: Moderately rapid
Available water capacity: Moderate
Organic matter content: Moderately low
Surface runoff: Slow

Inclusions

Contrasting inclusions:

- Banks soils, which have more sand than the Trembles soil and are on low flood plains
- Havreton soils, which have more clay than the Trembles soil and are on high flood plains

Similar inclusions:

- Soils that are leached of free carbonates to a depth of more than 40 inches

Use and Management

Cropland and pasture

General management considerations:

- The soil is unsuited to cropland.

Management concerns: Meandering channels, wetness

Management measures:

- Proper grazing management helps to maintain plant vigor.

Interpretive Groups

Land capability classification: Vlw-1

Range site: Loamy Overflow

Windbreak suitability group: 1

Pasture suitability group: H

Tt—Trembles fine sandy loam, terrace

Composition

Trembles soil and similar inclusions: 90 to 99 percent

Contrasting inclusions: 1 to 10 percent

Setting

Landform: Terraces

Landscape position: High terraces

Slope range: 0 to 2 percent

Shape of areas: Elongated or irregular

Size of areas: 10 to 150 acres

Typical Profile

Surface layer:

0 to 9 inches—grayish brown fine sandy loam

Underlying layer:

9 to 39 inches—grayish brown, calcareous fine sandy loam that is stratified with thin lenses of silt and fine sand

39 to 60 inches—grayish brown, calcareous loamy fine sand that is stratified with thin lenses of fine sand and silt

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: Rare

Permeability: Moderately rapid

Available water capacity: Moderate

Organic matter content: Moderately low

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- Havreton soils, which have more clay than the Trembles soil and are on high flood plains

Similar inclusions:

- Soils that are leached of free carbonates to a depth of more than 40 inches

Use and Management

Cropland and pasture

Main crops: Wheat, oats, and alfalfa

Management concerns: Wind erosion

Management measures:

- Minimizing tillage, leaving crop residue on the surface, stripcropping, establishing field windbreaks, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain the content of organic matter.

Interpretive Groups

Land capability classification: IIIe-7

Range site: Loamy Terrace

Windbreak suitability group: 5

Pasture suitability group: H

VeA—Vebar fine sandy loam, 0 to 2 percent slopes

Composition

Vebar soil and similar inclusions: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Dissected plains

Landscape position: Back slopes

Slope range: 0 to 2 percent

Shape of areas: Irregular

Size of areas: 10 to 300 acres

Typical Profile

Surface layer:

0 to 7 inches—very dark grayish brown fine sandy loam

Subsoil:

7 to 13 inches—dark brown fine sandy loam
 13 to 23 inches—dark yellowish brown fine sandy loam

Underlying layer:

23 to 30 inches—yellowish brown fine sandy loam
 30 to 60 inches—soft, weakly cemented sandstone

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Moderately deep

Depth to a contrasting or impervious layer: 20 to 40 inches to soft sandstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderately rapid

Available water capacity: Low

Organic matter content: Moderate

Surface runoff: Slow

Inclusions**Contrasting inclusions:**

- The sodium-affected Ekalaka soils on foot slopes
- Parshall soils, which are dark to a depth of more than 16 inches and are on foot slopes
- Reeder soils, which have more clay in the subsoil than the Vebar soil and are on back slopes

Use and Management**Cropland and pasture**

Main crops: Wheat, oats, and alfalfa

Management concerns: Wind erosion, the low available water capacity

Management measures:

- Minimizing tillage, leaving crop residue on the surface, stripcropping, establishing field windbreaks, and including grasses and legumes in the cropping system help to conserve moisture and control erosion.

Interpretive Groups

Land capability classification: IIIe-9

Range site: Sandy

Windbreak suitability group: 6

Pasture suitability group: H

VeB—Vebar fine sandy loam, 2 to 6 percent slopes**Composition**

Vebar soil and similar inclusions: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Dissected plains

Landscape position: Back slopes

Slope range: 2 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 700 acres

Typical Profile**Surface layer:**

0 to 7 inches—very dark grayish brown fine sandy loam

Subsoil:

7 to 13 inches—dark brown fine sandy loam

13 to 23 inches—dark yellowish brown fine sandy loam

Underlying layer:

23 to 30 inches—yellowish brown fine sandy loam

30 to 60 inches—soft, weakly cemented sandstone

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Moderately deep

Depth to a contrasting or impervious layer: 20 to 40 inches to soft sandstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderately rapid

Available water capacity: Low

Organic matter content: Moderate

Surface runoff: Slow

Inclusions**Contrasting inclusions:**

- Cohagen soils, which have sandstone within a depth of 20 inches and are on shoulders
- The sodium-affected Daglum, Ekalaka, and Rhoades soils on foot slopes and toe slopes
- Parshall soils, which are dark to a depth of more than 16 inches and are on foot slopes
- Reeder soils, which have more clay in the subsoil than the Vebar soil and are on back slopes

Use and Management**Cropland and pasture**

Main crops: Wheat, oats, and alfalfa

Management concerns: Wind erosion, the low available water capacity

Management measures:

- Minimizing tillage, leaving crop residue on the surface, stripcropping, establishing field windbreaks, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain the content of organic matter.

Interpretive Groups

Land capability classification: IIIe-10

Range site: Sandy

Windbreak suitability group: 6

Pasture suitability group: H

VhB—Vebar-Cohagen fine sandy loams, 2 to 9 percent slopes

Composition

Vebar soil and similar inclusions: 50 to 60 percent
Cohagen soil and similar inclusions: 25 to 40 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Dissected plains

Landscape position: Vebar—back slopes; Cohagen—summits and shoulders

Slope range: Vebar—2 to 6 percent; Cohagen—6 to 9 percent

Shape of areas: Irregular

Size of areas: 10 to 200 acres

Typical Profile

Vebar

Surface layer:

0 to 7 inches—very dark grayish brown fine sandy loam

Subsoil:

7 to 13 inches—dark brown fine sandy loam

13 to 23 inches—dark yellowish brown fine sandy loam

Underlying layer:

23 to 30 inches—yellowish brown fine sandy loam

30 to 60 inches—soft, weakly cemented sandstone

Cohagen

Surface layer:

0 to 5 inches—dark brown fine sandy loam

Underlying layer:

5 to 16 inches—dark yellowish brown fine sandy loam

16 to 60 inches—soft, weakly cemented sandstone

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Vebar—moderately deep; Cohagen—shallow

Depth to a contrasting or impervious layer: Vebar—20 to 40 inches to soft sandstone; Cohagen—10 to 20 inches to soft sandstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Moderately rapid

Available water capacity: Vebar—low; Cohagen—very low

Organic matter content: Vebar—moderate; Cohagen—low

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- Parshall soils, which are dark to a depth of more

than 16 inches and are on foot slopes

- Reeder soils, which have more clay in the subsoil than the Vebar soil and are on back slopes

Similar inclusions:

- Vebar soils that have more clay in the subsoil
- Vebar soils that have sandstone at a depth of more than 40 inches
- Cohagen soils that have sandstone at a depth of less than 10 inches

Use and Management

Cropland and pasture

General management considerations:

- The Cohagen soil is unsuited to cropland.
- Most of the acreage supports native grasses and is grazed.

Main crops: Wheat, oats, and alfalfa in areas of the Vebar soil

Management concerns: Wind erosion, the low available water capacity in the Vebar soil, the very low available water capacity in the Cohagen soil

Management measures:

- Minimizing tillage, leaving crop residue on the surface, stripcropping, establishing field windbreaks, and including grasses and legumes in the cropping system help to conserve moisture, control erosion, and maintain the content of organic matter.

Interpretive Groups

Land capability classification: Vebar—IIIe-10; Cohagen—Vle-10

Range site: Vebar—Sandy; Cohagen—Shallow

Windbreak suitability group: Vebar—6; Cohagen—10

Pasture suitability group: Vebar—H; Cohagen—G

WaD—Wabek gravelly sandy loam, 2 to 35 percent slopes

Composition

Wabek soil and similar inclusions: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Dissected plains

Landscape position: Summits, shoulders, and the upper back slopes

Slope range: 2 to 35 percent

Shape of areas: Long and narrow

Size of areas: 10 to 50 acres

Typical Profile

Surface layer:

0 to 8 inches—dark grayish brown gravelly sandy loam

Underlying layer:

8 to 12 inches—multicolored, calcareous gravelly coarse sand

12 to 60 inches—multicolored, calcareous very gravelly sand

Soil Properties and Qualities

Drainage class: Excessively drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: 7 to 14 inches to sand and gravel

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Very rapid

Available water capacity: Very low

Organic matter content: Moderately low

Surface runoff: Medium

Inclusions*Contrasting inclusions:*

- Cabba, Flasher, Sansarc, and Wayden soils, which are not underlain by sand and gravel and are on shoulders and on back slopes below the Wabek soil
- Lehr soils, which are deeper to sand and gravel than the Wabek soil and are on back slopes

Similar inclusions:

- Soils that have a surface layer that is lighter colored than that of the Wabek soil

Use and Management**Cropland and pasture***General management considerations:*

- The soil is unsuited to cropland.

Management concerns: Wind erosion, water erosion, the very low available water capacity

Management measures:

- Proper grazing management helps to maintain plant vigor, conserve moisture, and control erosion.

Interpretive Groups

Land capability classification: VIs-4

Range site: Very Shallow

Windbreak suitability group: 10

Pasture suitability group: NS

WcE—Wayden-Cabba complex, 9 to 40 percent slopes**Composition**

Wayden soil and similar inclusions: 50 to 65 percent

Cabba soil and similar inclusions: 25 to 35 percent

Contrasting inclusions: 5 to 20 percent

Setting

Landform: Dissected plains

Landscape position: Wayden—the upper back slopes;

Cabba—summits and shoulders

Slope range: 9 to 40 percent

Shape of areas: Elongated or irregular

Size of areas: 10 to 250 acres

Typical Profile**Wayden***Surface layer:*

0 to 5 inches—grayish brown silty clay loam

Underlying layer:

5 to 18 inches—olive, calcareous silty clay loam

18 to 60 inches—bedded shale

Cabba*Surface layer:*

0 to 4 inches—dark grayish brown loam

Underlying layer:

4 to 10 inches—grayish brown, calcareous loam

10 to 32 inches—grayish brown, weakly cemented sandstone

32 to 60 inches—soft siltstone

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Shallow

Depth to a contrasting or impervious layer: Wayden—10 to 20 inches to shale; Cabba—10 to 20 inches to soft sandstone and siltstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Wayden—slow; Cabba—moderate

Available water capacity: Very low

Organic matter content: Low

Surface runoff: Medium or rapid

Inclusions*Contrasting inclusions:*

- Amor soils, which have bedrock below a depth of 20 inches and are on back slopes
- Cohagen and Flasher soils, which have less clay than the Wayden and Cabba soils and are on shoulders and the upper back slopes in small pockets and strips

Use and Management**Cropland and pasture***General management considerations:*

- The soils are unsuited to cropland.

Management concerns: Wind erosion, water erosion, the very low available water capacity, the slope

Management measures:

- Proper grazing management helps to maintain plant vigor, conserve moisture, and control erosion.

Interpretive Groups

Land capability classification: Wayden—Vlle-8; Cabba—Vle-11

Range site: Shallow

Windbreak suitability group: 10

Pasture suitability group: NS

WdE—Wayden and Cabba soils, 6 to 40 percent slopes, extremely stony

Composition

Wayden soil and similar inclusions: 10 to 95 percent

Cabba soil and similar inclusions: 10 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landform: Dissected plains

Landscape position: Wayden—summits, shoulders, and the upper back slopes; Cabba—summits and shoulders

Slope range: 6 to 40 percent

Shape of areas: Elongated or irregular

Size of areas: 15 to 100 acres

Typical Profile

Wayden

Surface layer:

0 to 5 inches—grayish brown silty clay loam

Underlying layer:

5 to 18 inches—olive, calcareous silty clay loam

18 to 60 inches—bedded shale

Cabba

Surface layer:

0 to 4 inches—dark grayish brown loam

Underlying layer:

4 to 10 inches—grayish brown, calcareous loam

10 to 32 inches—grayish brown, weakly cemented sandstone

32 to 60 inches—soft siltstone

Soil Properties and Qualities

Drainage class: Well drained

Depth to bedrock: Shallow

Depth to a contrasting or impervious layer: Wayden—10 to 20 inches to shale; Cabba—10 to 20 inches to soft sandstone and siltstone

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Wayden—slow; Cabba—moderate

Available water capacity: Very low

Organic matter content: Low

Surface runoff: Medium or rapid

Inclusions

Contrasting inclusions:

- Reeder and Vebar soils, which have soft bedrock at a depth of 20 to 40 inches and are on back slopes
- Regent soils, which have soft bedrock at a depth of 20 to 40 inches and are in landscape positions similar to those of the Wayden soil

Similar inclusions:

- Cabba soils that have less clay

Use and Management

Cropland and pasture

General management considerations:

- The soils are unsuited to cropland.
- Rocks that are 1 to 4 feet in diameter cover 3 to 30 percent of the surface, and a few larger boulders are in some areas.

Management concerns: Water erosion, the very low available water capacity, the slope

Management measures:

- Proper grazing management helps to maintain plant vigor, conserve moisture, and control erosion.

Interpretive Groups

Land capability classification: Vlls-6

Range site: Shallow

Windbreak suitability group: 10

Pasture suitability group: NS

Wt—Wendte silty clay, channeled

Composition

Wendte soil and similar inclusions: 90 to 95 percent

Contrasting inclusions: 5 to 10 percent

Setting

Landform: Flood plains

Landscape position: High flood plains

Slope range: 0 to 2 percent

Shape of areas: Long and narrow

Size of areas: 10 to 50 acres

Typical Profile

Surface layer:

0 to 5 inches—dark grayish brown silty clay

Underlying layer:

5 to 31 inches—gray silty clay

31 to 60 inches—grayish brown, stratified silty clay and silty clay loam

Soil Properties and Qualities

Drainage class: Moderately well drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: Frequency—occasional; duration—brief

Permeability: Slow

Available water capacity: Moderate

Organic matter content: Moderate

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- Bullcreek, Hurley, and Promise soils, which have more clay and less stratification than the Wendte soil and are on foot slopes and toe slopes
- The poorly drained Lallie soils on low flood plains

Use and Management

Cropland and pasture

General management considerations:

- The soil is unsuited to cropland.

Management concerns: Meandering channels, wetness, compaction during wet periods

Management measures:

- Proper grazing management helps to maintain plant vigor, conserve moisture, and control erosion.
- Restricted grazing during wet periods helps to prevent compaction and the deterioration of tilth.

Interpretive Groups

Land capability classification: Vlw-1

Range site: Clayey Overflow

Windbreak suitability group: 4

Pasture suitability group: NS

ZeB—Zeona loamy fine sand, 0 to 6 percent slopes

Composition

Zeona soil and similar inclusions: 85 to 95 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Plains

Landscape position: Back slopes

Slope range: 0 to 6 percent

Shape of areas: Irregular

Size of areas: 10 to 300 acres

Typical Profile

Surface layer:

0 to 4 inches—dark grayish brown loamy fine sand

Underlying layer:

4 to 44 inches—light olive brown and grayish brown loamy fine sand

44 to 60 inches—grayish brown, calcareous loamy fine sand

Soil Properties and Qualities

Drainage class: Excessively drained

Depth to bedrock: Deep

Depth to a contrasting or impervious layer: More than 60 inches

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Rapid

Available water capacity: Low

Organic matter content: Moderately low

Surface runoff: Slow

Inclusions

Contrasting inclusions:

- The sodium-affected Bullock, Ekalaka, and Parchin soils on foot slopes adjacent to the Zeona soil and along drainageways
- Telfer soils, which have a surface layer that is darker than that of the Zeona soil and are on shoulders
- Slickspots, which have salts at or near the surface and are in microlows on foot slopes

Use and Management

Cropland and pasture

General management considerations:

- The soil is unsuited to cropland.

Management concerns: Wind erosion, the low available water capacity

Management measures:

- Proper grazing management helps to maintain plant vigor, conserve moisture, and control erosion.

Interpretive Groups

Land capability classification: Vle-7

Range site: Sands

Windbreak suitability group: 7

Pasture suitability group: NS

ZsD—Zeona-Slickspots-Rock outcrop complex, 0 to 30 percent slopes

Composition

Zeona soil and similar inclusions: 45 to 55 percent

Slickspots and similar inclusions: 20 to 30 percent

Rock outcrop and similar inclusions: 15 to 25 percent

Contrasting inclusions: 5 to 15 percent

Setting

Landform: Dissected plains

Landscape position: Zeona—back slopes; Slickspots—

microlows on foot slopes; Rock outcrop—summits and shoulders

Slope range: Zeona—0 to 9 percent; Slickspots—0 to 6 percent; Rock outcrop—0 to 30 percent

Shape of areas: Irregular

Size of areas: 20 to 200 acres

Typical Profile

Zeona

Surface layer:

0 to 4 inches—dark grayish brown loamy fine sand

Underlying layer:

4 to 44 inches—light olive brown and grayish brown loamy fine sand

44 to 60 inches—grayish brown, calcareous loamy fine sand

Slickspots

- Slickspots have a light gray, dispersed surface crust and dense, massive underlying material.
- Accumulations of visible salts are at or near the surface.
- Slickspots are barren or nearly barren of vegetation.

Rock outcrop

- Rock outcrop consists of eroding exposures of soft bedrock.
- Rock outcrop is barren of vegetation.

Soil Properties and Qualities

Drainage class: Zeona—excessively drained; Slickspots—moderately well drained

Depth to bedrock: Zeona and Slickspots—deep

Depth to a contrasting or impervious layer: Zeona—more than 60 inches; Slickspots—40 to more than 60 inches to soft bedrock; Rock outcrop—soft bedrock at the surface

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Permeability: Zeona—rapid; Slickspots—very slow

Available water capacity: Zeona and Slickspots—low

Organic matter content: Zeona and Slickspots—moderately low

Surface runoff: Zeona and Slickspots—slow; Rock outcrop—rapid

Inclusions

Contrasting inclusions:

- The sodium-affected Bullock and Parchin soils on foot slopes adjacent to the Zeona soil and along drainageways
- Lallie soils, which have visible salts throughout and are on low flood plains

Similar inclusions:

- Areas of Rock outcrop that have 1 to 5 inches of weathered material on the surface

Use and Management

Cropland and pasture

General management considerations:

- Areas of this map unit are unsuited to cropland.
- The steep slopes are dissected by entrenched drainageways and include numerous blowouts.

Management concerns: Zeona—wind erosion, the low available water capacity; Slickspots—content of salts; Rock outcrop—exposed areas of barren bedrock

Management measures:

- Proper grazing management helps to maintain plant vigor, conserve moisture, and control erosion.

Interpretive Groups

Land capability classification: Zeona—Vle-7;

Slickspots—VIIIs-3; Rock outcrop—VIIIs-1

Range site: Zeona—Sands; Slickspots and Rock outcrop—none assigned

Windbreak suitability group: 10

Pasture suitability group: NS

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban or built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal expenditure of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded

during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Soil Conservation Service.

About 205,200 acres in the survey area, or nearly 13 percent of the total acreage, meets the soil requirements for prime farmland. Areas of this land are throughout the county. About half of the acreage of this prime farmland is used for crops. The main crops grown on this land are alfalfa, oats, and wheat.

The map units in the survey area that are considered prime farmland are listed in table 5. This list does not

constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Soils that receive an inadequate amount of rainfall qualify as prime farmland only in areas where this limitation has been overcome by irrigation. The need for irrigation is indicated after the map unit names in table 5. Onsite evaluation is needed to determine whether or not a specific area is irrigated.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

The soils in the survey area are assigned to various interpretive groups at the end of each map unit description and in some of the tables. The groups for each map unit also are shown under the heading "Interpretive Groups," which follows the tables at the back of this survey.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

About 24 percent of the acreage of Corson County is used for cultivated crops or for tame pasture and hay (3). The major crops are winter wheat, spring wheat, oats, and alfalfa. Barley, corn, and sunflowers are also grown. Winter wheat, spring wheat, and sunflowers are grown as cash crops. Oats, barley, and corn are grown as cash crops and as livestock feed. Alfalfa is harvested mainly for hay. Alfalfa, crested wheatgrass, and intermediate wheatgrass are grown for tame pasture.

The soils in the county have good potential for increased crop production. Crop production could be increased considerably by extending the latest technology to all of the cropland in the county. This soil survey can greatly facilitate the application of such technology. The paragraphs that follow describe the management needed on the cropland in the county.

Water erosion reduces productivity and results in sedimentation. It is a hazard on soils such as Opal and Reeder soils if the slope is more than 2 percent. Productivity is reduced when the fertile surface layer is lost and part of the subsoil is incorporated into a plow layer. Loss of the surface layer is especially damaging on soils that have a thin surface layer, such as Cabba, Dupree, Wabek, and Wayden soils. Erosion also reduces the productivity of soils that tend to be droughty, such as Stady and Vebar soils. When erosion

occurs, sediment rich in nutrients enters streams, lakes, and reservoirs. Measures that control erosion minimize this pollution and preserve water quality for fish and other wildlife and for recreational uses. They also reduce the amount of fertilizer needed in cropped areas by helping to prevent the removal of plant nutrients and applied pesticides.

A cropping system that keeps a plant cover on the surface for extended periods holds soil losses to an amount that does not reduce the productive capacity of the soils. If a plant cover cannot protect the soil, careful management of crop residue is essential. Minimizing tillage and leaving crop residue on the surface increase the infiltration rate, reduce the runoff rate, and help to control erosion. Conservation tillage includes noninversion tillage. This practice leaves a protective amount of crop residue on the surface throughout the year. It is effective in minimizing wind erosion and water erosion. Conservation tillage also includes no-till planting, strip tillage, stubble mulching, and chemical fallow systems that have a minimum number of tillage operations. Stubble left standing on fields during winter traps and holds snow until it melts and thus provides additional moisture to the soil.

Terraces and diversions help to control erosion by reducing the length of slopes and the runoff rate. They are most practical on deep, well drained soils that have long, smooth slopes, such as Bryant, Farnuf, Promise, and Shambo soils. Many of the soils in the county, however, are poorly suited to terraces and diversions because they have short, irregular slopes. On some soils, such as Opal, Reeder, Regent, Stady, and Vebar soils, terrace channels would expose an unfavorable subsoil. Grassed waterways are effective in controlling gully erosion.

Wind erosion is a slight to severe hazard on many of the soils in the county. It is especially severe on soils that have a surface layer of fine sandy loam or loamy fine sand, such as Evridge, Tally, and Vebar soils. Soils that have a high content of clay in the surface layer, such as Bullcreek, Opal, and Promise soils, also are susceptible to wind erosion. Wind erosion can damage these soils in a few hours if winds are strong and if the soils are dry and are not protected by a plant cover or surface mulch. Wind erosion can be controlled by an adequate cover of plants or crop residue, stripcropping, and tillage methods that keep the surface rough. Windbreaks of suitable trees and shrubs and strips of unharvested crops left on fields also are effective in controlling wind erosion.

Information about the measures that control erosion on each kind of soil is contained in the Technical Guide, available in the local office of the Soil Conservation Service.

Soil fertility helps to determine the yields that can be obtained from the soil. A good nutrient management program helps to ensure the nutrients needed by a specific crop and optimize crop yields. The kind and amount of fertilizer needed on soils that have a high content of lime in the surface layer, such as Cabba soils, generally differ from the kind and amount needed on soils that do not have lime in the surface layer. A nutrient management plan should be based on type of soil, available moisture, the crop selected for planting, a realistic goal for yields, current test levels of soil fertility, whether or not legumes have been planted in either of the last 2 years, whether or not agricultural waste has been applied, and the chance of the pollution of surface water or ground water. The plan should be developed annually and provide information about the amount of each nutrient needed, the form or forms of nutrients to apply, the time to apply nutrients, the method of application, and the site of application. The Soil Conservation Service, the South Dakota Cooperative Extension Service, and the South Dakota Agricultural Experiment Station can help in developing a management plan.

Soil tilth is an important factor affecting the germination of seeds and the infiltration of water into the soil. Soils that have good tilth are granular and porous. Management can improve or maintain the tilth of a specific soil. Managing a soil for good tilth generally increases the water infiltration rate and the available water capacity and provides a better environment for seedling emergence and root development. Such management has a positive affect on crop yields. Also, if tilth is improved, less horsepower may be required for tillage equipment.

Good tilth management includes planting high-residue crops in a rotation system most of the time; keeping equipment and livestock off the soil during wet periods (especially on clayey soils, such as Bullcreek, McKenzie, Opal, and Promise soils, and on soils that have a claypan, such as Daglum and Parchin soils); leaving as much residue as possible on or near the surface of the soil; and eliminating unnecessary tillage operations.

Field crops suited to the soils and climate of the county include small grain and row crops. Winter wheat, spring wheat, barley, and oats are the main small grain crops. Corn and sunflowers are the main row crops. About one-third of the corn crops is used for silage.

All of the crops commonly grown in the county are suited to deep, well drained soils, such as Grail and Savage soils. Soils that have a low available water capacity, such as Opal and Regent soils, are better suited to early maturing small grain crops than to the deeper rooted crops, such as sorghum and alfalfa. Soils

that are susceptible to wind erosion, such as Tally and Vebar soils, are better suited to high-residue crops, such as small grain and alfalfa, that can protect fields from wind erosion under proper management.

Conservation practices, such as field windbreaks or no-till planting, may be needed to control wind erosion in areas of low-residue crops, such as sunflowers and summer fallow.

The *pasture plants* that are best suited to the climate and most of the soils in the county include alfalfa, crested wheatgrass, and intermediate wheatgrass. Because of the hazard of erosion, bunch grasses, such as crested wheatgrass, should not be planted in areas where the slope is more than 6 percent. In areas of the poorly drained Heil soils, western wheatgrass is the species best suited to pasture but Garrison creeping foxtail and reed canarygrass are also suitable. Pubescent wheatgrass is suitable in areas of Daglum and other soils that have a claypan in the subsoil.

If the pasture is overgrazed, the grasses lose vigor and die and usually are replaced by annual grasses and weeds. Proper stocking rates, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

Each soil in the county has been assigned to a pasture suitability group. These groups are based primarily on the suitability of the soil for certain pasture species, management needs, and potential productivity. They are listed at the end of each map unit description and under the heading "Interpretive Groups," which follows the tables at the end of this survey. Detailed interpretations for each pasture suitability group in the county are provided in the Technical Guide, which is available in the local office of the Soil Conservation Service.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of

weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for pasture and hayland, for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit (7). These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, VIIe-4 or IIle-6.

The capability classification of each map unit is given in the section "Detailed Soil Map Units" and under the heading "Interpretive Groups," which follows the tables at the back of this survey.

Rangeland

David W. Schmidt, range conservationist, Soil Conservation Service, helped prepare this section.

Range is land which supports native vegetation suitable for grazing. It includes areas where native vegetation has been reestablished. The vegetation is mainly grasses, grasslike plants, forbs, or shrubs. The amount and kind of native vegetation growing in any one area are determined by the soil, topography, climate, past use, and management.

All of the county was range before the first permanent settlers arrived. Approximately 76 percent of the county currently supports native vegetation. Range

supplies a major portion of the forage for livestock in the county.

Approximately 77 percent of the farm and ranch income in the county is derived from the sale of livestock and livestock products. Most of the ranches are cow-calf enterprises, but some are yearling enterprises. Also, some ranches include both cow and yearling enterprises. The range generally is grazed from May through October. The forage provided by range generally is supplemented by crop residue and tame pasture plants, such as crested wheatgrass and intermediate wheatgrass. In winter, it is supplemented by protein concentrate and hay.

Corson County is part of the mixed-grass prairie. The native vegetation is dominated by mid grasses, short grasses, and forbs. Some tall grasses are interspersed with these plants. The mixed-grass prairie consists of cool- and warm-season plants that provide good-quality forage throughout the growing season. Most of the growth of the cool-season plants occurs from April through June, and most of the growth of the warm-season plants occurs from June through August. The cool-season grasses may start growing again in September and October if autumn rainfall is adequate.

The production of native vegetation in some parts of the county is below potential because of past misuse. Many of the tall grasses and some of the mid grasses have been replaced by short grasses. As a result, the total amount of available forage has been reduced. In most areas, however, the original high-quality plants can be reestablished under good grazing management.

Range Sites and Condition Classes

Different kinds of soil vary in their capacity to produce native vegetation. Soil properties that affect moisture supply and plant nutrients have the greatest influence on the productivity of range plants. Soil reaction, salt content, and a seasonal high water table are also important. Soils that produce approximately the same kinds, amounts, and proportions of native vegetation make up a range site. The potential native vegetation on a range site is the stabilized plant community that the site is capable of producing. It consists of the plants that were growing on the site when the region was settled. This plant community maintains itself and changes very little as long as the environment remains unchanged. The relationship between soils and vegetation was ascertained during this survey; thus range sites generally can be determined directly from the soil map.

The plants within the native plant community are sometimes grouped as decreasers, increasers, or invaders, depending on their response to grazing

pressure. *Decreasers* are plants that respond to overgrazing by decreasing in abundance. They generally are the most productive plants and the ones most preferred by grazing animals. *Increasesers* are plants that respond to grazing pressure, at least initially, by increasing in amount as the more desirable decreaser plants become less abundant. Increasesers generally are less productive and less preferred by grazing animals. *Invaders* are plants that are not part of the original plant community but invade because of some kind of disturbance or continued overgrazing. Most invader plants have little or no value as forage plants. Because plants do not respond in the same manner to different influences, a plant may be a decreaser on some range sites but an increaser on others.

Table 7 shows, for nearly all of the soils, the range site, the potential natural plant community, and the potential annual production of vegetation in favorable, average, and unfavorable years. *Potential annual production* is the amount of vegetation that can be expected to grow annually on well managed rangeland that is supporting the potential natural plant community. It includes all vegetation, whether or not it is palatable to grazing animals. It includes the current year's growth of leaves, twigs, and fruits of woody plants. It does not include the increase in stem diameter of trees and shrubs. It is expressed in pounds per acre of air-dry vegetation for favorable, average, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In an unfavorable year, growing conditions are well below average, generally because of low available soil moisture.

Yields are adjusted to a common percent of air-dry moisture content. The relationship of green weight to air-dry weight varies according to such factors as exposure, amount of shade, recent rains, and unseasonable dry periods.

Range management helps to maintain forage production and provides wildlife habitat, water, and watershed protection. The primary objective of range management is to keep the range in excellent or good condition. The main management concern is responding to important changes in the plant community on a range site.

Range condition is determined by comparing the present vegetation on a range site with the potential native plant community for that site. Four range condition classes are recognized. The range site is in *excellent* condition if 76 to 100 percent of the present vegetation is the same kind as the potential native

vegetation, in *good* condition if the percentage is 51 to 75, in *fair* condition if the percentage is 26 to 50, and in *poor* condition if the percentage is 25 or less.

Rangeland productivity depends on the range site, the range condition, and the moisture available to plants during the growing season.

Measures that maintain or improve the range condition are needed on all of the range in the county. They include proper stocking rates and rotation grazing or deferred grazing systems. These systems provide rest periods that maintain or improve the vigor of the key plants. Good management also includes range seeding, fencing, watering facilities, and mechanical treatment, such as contour furrowing and deep chiseling.

Seventeen range sites are recognized in Corson County. At the end of each map unit in the section "Detailed Soil Map Units" and under the heading "Interpretive Groups," which follows the tables at the back of this survey, each soil is assigned to a range site. The range sites are Clayey, Clayey Overflow, Claypan, Closed Depression, Dense Clay, Loamy Overflow, Loamy Terrace, Saline Lowland, Sands, Sandy, Shallow, Shallow Clay, Shallow to Gravel, Silty, Thin Claypan, Thin Upland, and Very Shallow. The paragraphs that follow describe these range sites.

Clayey range site. The potential native vegetation on this site is mid and short prairie grasses that are interspersed with a variety of forbs and shrubs. Cool-season grasses are dominant. They are mainly green needlegrass and western wheatgrass. Warm-season grasses, such as blue grama, little bluestem, and sideoats grama, are not so abundant as the cool-season grasses. Forbs, such as heath aster, prairie coneflower, yarrow, false-boneset, and scarlet globemallow, are common but not dominant.

The major management concern on this site is maintaining the extent of the most productive grasses. If the site is overgrazed, green needlegrass and western wheatgrass lose their productive capacity because livestock prefer these plants. If overgrazing continues, western wheatgrass and green needlegrass decrease in abundance and blue grama and buffalograss increase. The extent of the most productive grasses can be maintained by proper stocking rates. Other management measures include rotation grazing and deferred grazing. Mechanical treatment is needed in some areas.

Clayey Overflow range site. The potential native vegetation on this site is mid and tall grasses. Cool-season grasses make up the majority of the vegetation.

They are mainly western wheatgrass and lesser amounts of green needlegrass. The understory includes short grasses, such as blue grama and buffalograss. If this site is in excellent condition, forbs and woody species are not of major importance.

The major management concern on this site is maintaining the extent of the most productive grasses. If the site is overgrazed, western wheatgrass decreases in abundance and buffalograss, blue grama, and weeds increase. The extent of the most productive grasses can be improved or maintained by proper stocking rates in combination with timely deferment of grazing or rotation grazing.

Claypan range site. The potential native vegetation on this site is a mixture of mid and short grasses. Cool-season grasses make up the majority of the vegetation. They are mainly western wheatgrass and lesser amounts of green needlegrass. Needleandthread may dominate in areas where the surface layer is fine sandy loam. Warm-season grasses, such as blue grama and buffalograss, are not so abundant as the cool-season grasses. Sedges and forbs are common but not dominant.

The major management concern on this site is maintaining the extent of the most productive grasses. If the site is overgrazed, needlegrass, western wheatgrass, needleandthread, and sideoats grama decrease in abundance and blue grama, buffalograss, and forbs increase. The result is low forage production. If overgrazing continues, a considerable amount of the surface remains bare, especially during droughty periods. The most productive grasses can be maintained by proper stocking rates in combination with a rotation or deferred grazing program that provides rest periods during the key growing seasons of these plants. Restricted grazing during wet periods helps to prevent surface compaction and the deterioration of tilth.

Closed Depression range site. The potential native vegetation on this site is mid grasses. The vegetation is mainly western wheatgrass and lesser amounts of sedges, rushes, and inland saltgrass. This site becomes excessively wet or ponded during wet periods and is droughty during abnormally dry periods.

The major management concern on this site is maintaining the extent of western wheatgrass. If the site is overgrazed, this grass decreases in abundance and rushes and weeds increase. The extent of western wheatgrass can be maintained by proper stocking rates in combination with timely deferment of grazing or rotation grazing.

Dense Clay range site. The potential native vegetation on this site is mid prairie grasses that are interspersed with forbs. Cool-season grasses are dominant. They are mainly western wheatgrass and green needlegrass. The amount of forbs, such as wild onion, is small. This site generally does not have an understory of short grasses.

The major management concern on this site is maintaining the extent of green needlegrass and western wheatgrass. If the site is overgrazed, these grasses decrease in abundance and unpalatable plants increase or the surface remains bare. Erosion is a serious problem in barren areas. The extent of green needlegrass and western wheatgrass can be maintained by proper stocking rates in combination with timely deferment of grazing or rotation grazing. Restricted grazing during wet periods helps to prevent surface compaction and the deterioration of tilth.

Loamy Overflow range site. The potential native vegetation on this site is mixed prairie grasses. Warm-season grasses make up the majority of the vegetation. They are mainly big bluestem and lesser amounts of switchgrass, little bluestem, and sideoats grama. Cool-season grasses, such as green needlegrass and western wheatgrass, are common but not dominant. Numerous forbs, shrubs, and sedges also grow in areas throughout the site.

The major management concern on this site is maintaining the extent of the most productive grasses. If the site is overgrazed, big bluestem, switchgrass, green needlegrass, and little bluestem rapidly decrease in abundance and western wheatgrass and sideoats grama increase. If overgrazing continues, Kentucky bluegrass, a short, cool-season grass, increases in abundance and dominates the site. The result is low forage production. The extent of the most productive grasses can be maintained by proper stocking rates in combination with timely deferment of grazing or rotation grazing.

Loamy Terrace range site. The potential native vegetation on this site is mixed prairie grasses. Cool-season grasses are dominant. They include western wheatgrass, green needlegrass, and needleandthread. Warm-season grasses, such as big bluestem, blue grama, and little bluestem, are not so abundant as the cool-season grasses. Numerous climax forbs, shrubs, and sedges also grow on this site.

The major management concern on this site is maintaining the extent of the most productive grasses. If the site is overgrazed, bluestems and green needlegrass decrease in abundance and western wheatgrass and needleandthread increase. If



Figure 11.—Surface salts on a Saline Lowland range site in an area of Lalle silty clay loam in the foreground. A farmstead windbreak in an area of Reeder-Cabba loams, 3 to 6 percent slopes, is in the background.

overgrazing continues, these grasses decrease in abundance and blue grama and Kentucky bluegrass increase. The result is low forage production. The extent of the most productive grasses can be maintained by proper stocking rates in combination with timely deferment of grazing or rotation grazing.

Saline Lowland range site. The potential native vegetation on this site is salt-tolerant grasses (fig. 11). The grasses are mainly western wheatgrass and Nuttall alkaligrass and lesser amounts of prairie cordgrass, alkali cordgrass, inland saltgrass, and blue grama. Sedges and forbs also grow on this site but do not

make up a significant portion of the total production. In some areas where the water table is high, prairie cordgrass and alkali cordgrass are dominant.

The major management concern on this site is maintaining the extent of the most productive grasses. If the site is overgrazed, western wheatgrass and prairie cordgrass decrease in abundance and inland saltgrass increases and dominates the site. The amount of the most productive grasses can be maintained by proper stocking rates in combination with timely deferment of grazing or rotation grazing.

Sands range site. The potential native vegetation on this site is tall and mid grasses. Warm-season grasses make up the majority of the vegetation. They are mainly prairie sandreed, little bluestem, and sand bluestem and lesser amounts of needleandthread, switchgrass, blue grama, and sedges. Small amounts of forbs and woody shrubs, such as leadplant, rose, and sand cherry, are common.

The main management concern on this site is maintaining the extent of the most productive grasses. If the site is overgrazed, bluestems, prairie sandreed, and switchgrass decrease in abundance and sand dropseed and blue grama increase. If overgrazing continues, green sagewort and scurfpea increase in abundance or invade the site. In places, the surface is bare and blowouts can be a severe hazard. The amount of the most productive grasses can be increased or maintained by proper stocking rates and by timely deferment of grazing or rotation grazing.

Sandy range site. The potential native vegetation on this site is mixed prairie grasses, chiefly mid and tall grasses. Warm-season grasses, such as little bluestem and sand bluestem, are dominant. Cool-season grasses, such as needleandthread and western wheatgrass, are not so abundant as the warm-season grasses. The understory includes sideoats grama and sedges. Forbs, such as scurfpea and sagewort, are common but occur only in small amounts.

The major management concern on this site is maintaining the extent of the most productive grasses. If the site is overgrazed, bluestems decrease in abundance and prairie sandreed and needleandthread increase. If overgrazing continues, these grasses decrease in abundance and sand dropseed, blue grama, threadleaf sedge, sagewort, and Kentucky bluegrass increase. The result is low forage production. The amount of the most productive grasses can be increased or maintained by proper stocking rates and by timely deferment of grazing or rotation grazing.

Shallow range site. The potential native vegetation on this site is mixed prairie grasses. Warm-season grasses, such as little bluestem, sideoats grama, prairie sandreed, and plains muhly, are dominant. Cool-season grasses, such as western wheatgrass, green needlegrass, and needleandthread, are not so abundant as the warm-season grasses. Sedges, forbs, and shrubs are common but occur only in small amounts.

The major management concern on this site is maintaining the extent of the most productive grasses. If the site is overgrazed, little bluestem decreases in abundance and western wheatgrass and sideoats grama increase. If overgrazing continues, sideoats grama and needleandthread decrease in abundance and the site supports only a sparse cover of sedges, blue grama, and weeds. The result is low forage production. The amount of the most productive grasses can be maintained or increased by proper stocking rates and by rotation grazing or timely deferment of grazing.

Shallow Clay range site. The potential native vegetation on this site is mixed prairie grasses. Cool-season grasses, such as western wheatgrass and green needlegrass, and warm-season grasses, such as little bluestem, sideoats grama, and big bluestem, are codominant. The amount of forbs, such as scurfpea, sagewort, and blacksamson, and of shrubs, such as skunkbush sumac, is small.

The major management concern on this site is maintaining the extent of the most productive grasses. If the site is overgrazed, little bluestem and big bluestem decrease in abundance because livestock prefer these plants. If overgrazing continues, western wheatgrass and sideoats grama decrease in abundance. If the amount of blue grama and unpalatable forbs increases, the result is low forage production. The extent of the most productive plants can be maintained by proper stocking rates in combination with timely deferment of grazing or rotation grazing.

Shallow to Gravel range site. The potential native vegetation on this site is mixed prairie grasses. Warm-season grasses, such as blue grama, little bluestem, and sideoats grama, and cool-season species, such as needleandthread, western wheatgrass, and sedges, are codominant. Forbs, such as prairie clover, blacksamson, dotted gayfeather, and heath aster, are not so abundant as the grasses.

The major management concern on this site is maintaining the extent of the most productive grasses. If the site is overgrazed, needleandthread, little bluestem, sideoats grama, green needlegrass, and western wheatgrass decrease in abundance and threadleaf

sedge, blue grama, hairy grama, and forbs increase. If overgrazing continues, the surface commonly remains bare. The extent of the most productive grasses can be maintained by proper stocking rates in combination with timely deferment of grazing or rotation grazing.

Silty range site. The potential native vegetation on this site is mixed prairie grasses. Cool-season grasses are dominant. They include green needlegrass and western wheatgrass and lesser amounts of needleandthread. Warm-season grasses, such as little bluestem and sideoats grama, are not so abundant as the cool-season grasses. The amount of shrubs and forbs, such as sagewort, heath aster, yarrow, false-boneset, leadplant, rose, goldenrod, and western snowberry, is small.

The major management concern on this site is maintaining the extent of the most productive grasses. If the site is overgrazed, bluestems, sideoats grama, western wheatgrass, green needlegrass, and needleandthread decrease in abundance and blue grama, Kentucky bluegrass, and threadleaf sedge increase. The result is low forage production. The extent of the most productive grasses can be increased or maintained by proper stocking rates in combination with timely deferment of grazing or rotation grazing.

Thin Claypan range site. The potential native vegetation on this site is a mixture of mid and short grasses. Warm-season grasses, such as blue grama and buffalograss, and cool-season grasses, such as western wheatgrass and needleandthread, are codominant. Pricklypear, sagebrush, and forbs, such as sagewort and brome snakeweed, are not so abundant as the grasses.

The major management concern on this site is maintaining the extent of western wheatgrass and needleandthread. If the site is overgrazed, these grasses decrease in abundance and blue grama, buffalograss, pricklypear, and inland saltgrass increase. If overgrazing continues, a considerable extent of the surface remains bare, especially during dry periods. Weeds increase in abundance during wet periods. The extent of the most productive grasses can be maintained or increased by proper stocking rates in combination with timely deferment of grazing or rotation grazing. Restricted grazing during wet periods helps to prevent surface compaction and the deterioration of tilth.

Thin Upland range site. The potential native vegetation is mixed prairie grasses. Cool-season grasses, such as western wheatgrass and needleandthread, and warm-season grasses, such as

little bluestem and sideoats grama, are codominant. The understory is mainly blue grama and threadleaf sedge. The amount of woody plants and forbs, such as sagewort, is small.

The major management concern on this site is maintaining the extent of the most productive grasses. If the site is overgrazed, little bluestem, needleandthread, and western wheatgrass decrease in abundance. If overgrazing continues, sedges and blue grama dominate the site. The result is low forage production. The extent of the most productive grasses can be increased or maintained by proper stocking rates in combination with timely deferment of grazing or rotation grazing.

Very Shallow range site. The potential native vegetation on this site is mid and short grasses. The mid grasses are mainly needleandthread and lesser amounts of little bluestem and sideoats grama. Blue grama and sedges are the dominant short grasses and grasslike species. Forbs, such as dotted gayfeather and sagewort, and shrubs, such as small soapweed and pricklypear, are not so abundant as the grasses.

The main management concern on this site is maintaining the extent of the most productive grasses. If the site is overgrazed, grama grasses, threadleaf sedge, and a few unpalatable forbs rapidly dominate the site. If overgrazing continues, the short grasses decrease in abundance and much of the surface remains bare and is subject to erosion. The extent of the most productive grasses can be increased or maintained by proper stocking rates and by timely deferment of grazing or rotation grazing.

Native Woodland, Windbreaks, and Environmental Plantings

Sheridan I. Dronen, forester, Soil Conservation Service, helped prepare this section.

Native trees and shrubs grow on about 7,000 acres in Corson County. They generally grow on the flood plains along the Grand River and along small creeks and drainageways. The soils that support trees are not classified as woodland soils. The early settlers used the trees and shrubs for fuel and food. Currently these trees and shrubs are used mainly for wildlife habitat and for the protection of livestock.

Scattered individual plants or clumps of plants, including green ash, American elm, boxelder, chokecherry, American plum, buffaloberry, snowberry, and wildrose, are common in draws in areas of Cabba soils. Plains cottonwood, peachleaf willow, and sandbar willow grow in areas of Havrelon soils on the flood plain of the Grand River. Green ash, American elm, boxelder,

chokecherry, and plum grow on narrow flood plains along the other major drainageways.

Windbreaks protect livestock, buildings, and yards from wind and snow. They also provide protection and habitat for wildlife. Several rows of broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, provide food and cover for wildlife, and help to increase crop yields.

Environmental plantings help to beautify and screen houses and other buildings. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 8 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 8 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks.

Grazing is extremely damaging to windbreaks and environmental plantings because it results in soil compaction and the loss of the lower branches of trees and shrubs. Removal of the lower branches reduces the effectiveness of the windbreaks. Following a year before planting helps to provide a reserve supply of moisture necessary for the establishment of the seedlings. Cultivation and applications of herbicides are effective methods of controlling weeds.

At the end of each description in the section "Detailed Soil Map Units" and under the heading "Interpretive Groups," which follows the tables at the back of this survey, the soils are assigned to a windbreak suitability group. A windbreak suitability group is a distinctive group of soils that support trees and shrubs having similar growth and survival rates if weather conditions are normal and the windbreak is properly managed. The relationship between the soils and the growth of trees and shrubs was ascertained during this survey. Soil properties that affect moisture supply and plant nutrients have the greatest influence on the growth of trees and shrubs. Soil reaction, salt content, and a seasonal high water table also are important.

Group 1. These soils are well suited to woody plants. They are on foot slopes and high flood plains. These soils receive additional moisture from runoff and flooding. Some are subirrigated. All climatically suited

trees and shrubs grow well on these soils.

This group consists mainly of deep, somewhat poorly drained to well drained, loamy, silty, and clayey soils. Available water capacity is moderate or high. The soils that are fine sandy loam and loamy fine sand are subject to severe wind erosion. Typical soils in this group are those of the Arnegard, Grail, Grassna, Havrelon, Korchea, Parshall, and Trembles series.

Group 2. These soils are well suited to woody plants. They receive additional moisture from runoff or have a high water table within the root zone. All climatically suited trees and shrubs grow well on these soils.

This group consists of deep, poorly drained and somewhat poorly drained, sandy, silty, loamy, and clayey soils. Available water capacity is high. The soils that are sandy loam and loamy fine sand are subject to severe wind erosion. In Corson County no soils are rated in this group.

Group 3. These soils are well suited to woody plants. They are on back slopes, foot slopes, and high terraces. Except for the trees and shrubs that require abundant moisture, all climatically suited trees and shrubs grow well on these soils.

This group consists of deep, well drained, loamy and silty soils. Available water capacity is moderate or high. The hazard of water erosion ranges from slight in areas of the nearly level soils to severe in areas of the strongly sloping soils. The hazard of wind erosion ranges from slight to severe. Typical soils in this group are those of the Bryant, Farnuf, Havrelon, Savage, and Shambo series.

Group 4. These soils are fairly well suited to woody plants. They are on back slopes, foot slopes, and high flood plains. Most of the climatically suited trees and shrubs generally grow well on these soils. Maximum growth, however, is not possible because of limited root development.

This group consists of moderately deep and deep, clayey soils and clayey soils that have loamy and silty surface layers. The soils are moderately well drained and well drained. Available water capacity is low or moderate in the more clayey soils and moderate or high in the silty and loamy soils. Soils that have accumulations of salts in the lower part of the subsoil also are in this group. The clayey soils are subject to severe wind erosion. The moderately sloping and strongly sloping soils are subject to severe water erosion. Typical soils in this group are those of the Belfield, Opal, Promise, Regent, and Wendte series.

Group 5. These soils are well suited to woody plants. They are on back slopes, foot slopes, shoulders, and high terraces. Except for the trees and shrubs that require abundant moisture, all climatically suited trees and shrubs grow well on these soils.

This group consists mainly of deep, well drained and somewhat excessively drained, loamy and sandy soils. Available water capacity generally is low or moderate. The soils are subject to severe or very severe wind erosion. Typical soils in this group are those of the Ekalaka, Evridge, Tally, Telfer, and Trembles series.

Group 6. These soils are poorly suited to woody plants. They are on back slopes and foot slopes. No trees and shrubs grow well on these soils. Plantings can be established, but optimum survival and growth should not be expected. Field windbreaks are not effective because of the slow growth rate of plants and their low height at maturity.

This group consists of well drained and somewhat excessively drained, silty and loamy soils. They are moderately deep to bedrock or are shallow or moderately deep to sand and gravel. Available water capacity is low or moderate. The moderately sloping and strongly sloping soils are subject to severe erosion. Typical soils in this group are those of the Lehr, Reeder, Stady, and Vebar series.

Group 7. These soils are poorly suited to woody plants. They are on back slopes and low flood plains. No trees or shrubs grow well on these soils. Coniferous trees and shrubs are better suited than deciduous trees and shrubs. Plantings can be established, but optimum survival and growth should not be expected. Field windbreaks are not effective because of the slow growth rate of plants and their low height at maturity.

This group consists of deep and moderately deep, somewhat excessively drained and excessively drained, sandy soils. Available water capacity is very low or low. The soils are subject to very severe wind erosion. Typical soils in this group are those of the Banks and Zeona series.

Group 8. These soils are poorly suited to woody plants. They are on shoulders. No trees and shrubs grow well on these soils. Plantings can be established, but optimum survival and growth should not be expected. Field windbreaks are not effective because of the slow growth rate of plants and their low height at maturity.

This group consists of deep and moderately deep, well drained, loamy and silty soils. The soils have enough calcium carbonate at or near the surface to adversely affect the growth and survival of trees and

shrubs. Available water capacity is moderate or high. The soils are subject to severe wind erosion and severe water erosion. Typical soils in this group are those of the Sutley series.

Group 9. These soils are poorly suited to woody plants. They have a dense claypan in the subsoil and an excessive amount of salt in the lower part of the subsoil. They are on back slopes and foot slopes. No trees and shrubs grow well on these soils because of the adverse affect of the dense claypan and the content of salts.

This group consists of deep, moderately well drained, silty and loamy soils. Available water capacity is low or moderate. Typical soils in this group are those of the Daglum and Parchin series.

Group 10. These soils generally are unsuited to woody plants. The soils are shallow to bedrock, very shallow to gravel, very saline, very alkaline, stony, or very wet. Specialized plantings for wildlife, recreation, or beautification, however, may be planted on some of these soils. The most favorable sites should be selected and only those trees and shrubs that have the best potential to survive and grow should be planted.

The soils in this group have a wide range of texture, depth, drainage, available water capacity, permeability, and slope. The hazards of water erosion and wind erosion range from slight to very severe. Typical soils in this group are those of the Amor, Bullcreek, Bullock, Cabba, Cohagen, Dupree, Flasher, Glenross, Harriet, Heil, Hurley, Lallie, McKenzie, Opal, Parchin, Rhoades, Sansarc, Shambo, Wabek, Wayden, and Zeona series.

Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service or from a commercial nursery.

Wildlife Habitat

Connie M. Vicuna, biologist, Soil Conservation Service, helped prepare this section.

Soils affect the kind and amount of vegetation that is available to wildlife for food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting or maintaining desirable vegetation or by promoting the natural establishment of desirable plants.

Rangeland wildlife species provide excellent outdoor recreational opportunities in Corson County. Most of the county is rangeland, and only about 24 percent is cropland. Because of this land use pattern, much of the

original character of the wildlife habitat remains and many of the original wildlife species, though less abundant, still inhabit the survey area. These species include antelope, mule deer, sharp-tailed grouse, wild turkey, jackrabbit, prairie dogs, and several grassland songbirds. Beaver, mink, muskrat, geese, ducks, cormorants, and herons also inhabit the county. Common predators include coyote, fox, weasel, badger, raccoon, skunk, golden eagle, hawks, and bobcat. Rattlesnakes also are common. Other species, such as white-tailed deer, pheasant, and gray partridge, have benefited from agricultural influences in the county.

Woody habitat is available on the bottom land along the Grand River, Oak Creek, Plum Creek, Black Horse Butte Creek, High Bank Creek, Firesteel Creek, Hay Creek, and other drainageways and in many draws. Although these shrubby and wooded areas are not abundant, they are very important for many rangeland species as a source of food or as cover during some part of the year. Stands of short woody cover on rangeland also are important sources of cover and food for wildlife.

Wetland habitat includes small areas in drainageways and some large, shallow basins. Stock dams also provide some wetland habitat. Waterfowl are abundant only during periods of migration. Some stock dams maintain small populations of breeding ducks and geese.

Fishing opportunities are available primarily along the Grand River and Lake Oahe. The other main sources of fishing are Works Progress Administration (WPA) dams and other multipurpose dams and lakes, such as Trail City Lake, Bohle Dam, Morristown Lake, Morristown Dam, Pudwell Dam, and Kellers Dam. All of these dams and lakes receive fishing pressure, and many local residents fish these areas of water much more than the Grand River or Lake Oahe. Some livestock dams have been stocked for public fishing.

Because of similarities in topography and in the ability to support vegetation, soil associations provide some indication of the actual and potential distribution and density of wildlife and their habitat. Land use and management have a primary influence on wildlife. They are influenced by the soil and often correlate with soil associations. The 12 soil associations in Corson County are described under the heading "General Soil Map Units."

In Corson County, the populations of antelope are largest in the open areas that have scattered sagebrush. These areas are in the Rhoades-Daglum-Reeder and Bullock-Parchin associations. Mule deer are most abundant on breaks along rivers and on the rougher land in areas of the Cabba-Wayden, Flasher-Vebar, and Sansarc-Dupree-Opal associations and in

the Rhoades-Daglum-Reeder and Bullock-Parchin associations. Sharp-tailed grouse inhabit areas throughout the county but generally are most abundant on the large expanses of grassland that are interspersed with woody cover. These areas of grassland are most common in the Cabba-Wayden, Flasher-Vebar, Sansarc-Dupree-Opal, Rhoades-Daglum-Reeder, and Bullock-Parchin associations.

White-tailed deer frequent areas of woody cover near cropland. Habitat for white-tailed deer is available in the Reeder-Cabba, Shambo-Farnuf-Stady, Regent-Reeder, and Trembles-Havrelon-Korchea associations.

The populations of pheasant and gray partridge are small. These species only inhabit scattered areas of cropland.

Individual soils have different potentials for the development and maintenance of wildlife habitat elements. Therefore, the soil affects the degree or extent to which wildlife habitat can be established or improved. In table 9, the soils of Corson County are rated according to their potential to provide each of the wildlife habitat elements. This information can be used in planning parks, wildlife areas, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat. The ratings, described in the following paragraphs, indicate the ease of establishing or maintaining these elements.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface

stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, sorghum, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are intermediate wheatgrass, pubescent wheatgrass, and alfalfa.

Native herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of native herbaceous plants are big bluestem, goldenrod, beggarweed, western wheatgrass, and grama.

Planted trees and shrubs are trees and shrubs that require cultivation before and during establishment. They produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of trees and shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of planted trees and shrubs are green ash, Russian-olive, plum, chokecherry, Rocky Mountain juniper, and eastern redcedar.

Native deciduous trees and woody understory produce nuts or other fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of deciduous plants are elm, cottonwood, ash, bur oak, willow, plum, and chokecherry.

Native coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, cedar, and juniper.

Native shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are skunkbush sumac, gooseberry, snowberry, and big sagebrush.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are

texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

Information about the management of habitat elements for specific wildlife species can be obtained from the local office of the Soil Conservation Service or the South Dakota Department of Game, Fish, and Parks.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water

table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the "Glossary."

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to

bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Sanitary Facilities

Table 11 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates

that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high

content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good*, *fair*, or *poor* as a source of roadfill and

topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a *probable* source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an *improbable* source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree

and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and

subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind erosion or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter (fig. 12). "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than

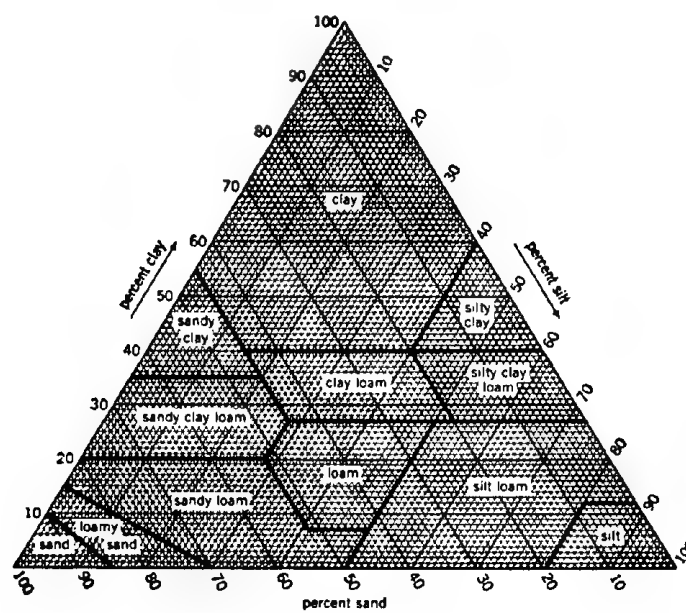


Figure 12.—Percentages of clay, silt, and sand in the basic USDA soil textural classes.

52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the "Glossary."

Classification of the soils is determined according to the Unified soil classification system (2) and the system adopted by the American Association of State Highway and Transportation Officials (1).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and plasticity index (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major

soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay

minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

- 4L. Calcareous loams, silt loams, clay loams, and

silty clay loams. These soils are erodible. Crops can be grown if intensive measures to control wind erosion are used.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are very slightly erodible. Crops can be grown if ordinary measures to control wind erosion are used.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control wind erosion are used.

8. Soils that are not subject to wind erosion because of coarse fragments on the surface or because of surface wetness.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 15, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate

when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a

saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be

needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed

as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (8). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 17 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Mollisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Boroll (*Bor*, meaning cool, plus *oll*, from Mollisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Argiborolls (*Argi*, meaning argillic horizon, plus *boroll*, the suborder of the Mollisols that has a cool temperature regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Argiborolls.

FAMILY. Families are established within a subgroup

on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed Typic Argiborolls.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the underlying material can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (9). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (8). Unless otherwise stated, matrix colors in the descriptions are for dry soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Amor Series

Depth to bedrock: Moderately deep

Drainage class: Well drained

Permeability: Moderate

Landform: Dissected plains

Parent material: Loamy residuum

Slope: 1 to 25 percent

Typical Pedon

Amor loam, in an area of Cabba-Amor loams, 15 to 60 percent slopes, 2,000 feet east and 225 feet south of the northwest corner of sec. 33, T. 19 N., R. 27 E.

A—0 to 7 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure parting to moderate fine granular; slightly hard, friable; neutral; gradual smooth boundary.

Bw—7 to 12 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; weak coarse prismatic structure parting to weak medium subangular blocky; slightly hard, friable, slightly sticky; neutral; clear smooth boundary.

Bk1—12 to 16 inches; light brownish gray (2.5Y 6/2) clay loam, grayish brown (2.5Y 5/2) moist; weak coarse prismatic structure parting to weak coarse subangular blocky; slightly hard, friable, slightly sticky; few fine accumulations of carbonate; strong effervescence; moderately alkaline; clear smooth boundary.

Bk2—16 to 21 inches; light brownish gray (2.5Y 6/2) clay loam, grayish brown (2.5Y 5/2) moist; weak coarse subangular blocky structure; slightly hard, friable, slightly sticky; few fine accumulations of carbonate; strong effervescence; moderately alkaline; clear smooth boundary.

Cr—21 to 60 inches; stratified soft sandstone and siltstone bedrock.

Range in Characteristics

Thickness of the mollic epipedon: 5 to 16 inches

Depth to carbonates: 10 to 20 inches

Depth to a contrasting or impervious layer: 20 to 40 inches to soft sandstone and siltstone

Arnegard Series

Depth to bedrock: Deep

Drainage class: Well drained

Permeability: Moderate

Landform: Plains

Parent material: Alluvium

Slope: 0 to 2 percent

Typical Pedon

Arnegard loam, 2,300 feet south and 1,900 feet east of the northwest corner of sec. 2, T. 19 N., R. 27 E.

A—0 to 9 inches; very dark gray (10YR 3/1) loam, black (10YR 2/1) moist; moderate coarse subangular

blocky structure parting to weak fine granular; slightly hard, very friable; slightly acid; clear wavy boundary.

Bw1—9 to 12 inches; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable; neutral; gradual wavy boundary.

Bw2—12 to 38 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable; neutral; gradual wavy boundary.

Bw3—38 to 47 inches; dark brown (10YR 4/3) loam, very dark grayish brown (2.5Y 3/2) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable; mildly alkaline; clear wavy boundary.

Bk—47 to 55 inches; brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; weak coarse subangular blocky structure; slightly hard, friable; few fine accumulations of carbonate; strong effervescence; moderately alkaline; clear wavy boundary.

C—55 to 60 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, friable; strong effervescence; mildly alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 16 to 50 inches

Depth to carbonates: 25 to 60 inches

Depth to a contrasting or impervious layer: More than 60 inches

The Arnegard soils in this county have chroma in the A horizon that are lower than those defined as the range for the series. This difference, however, does not significantly affect the use or behavior of the soils.

Banks Series

Depth to bedrock: Deep

Drainage class: Excessively drained and somewhat excessively drained

Permeability: Rapid

Landform: Flood plains

Parent material: Sandy alluvium

Slope: 0 to 2 percent

Typical Pedon

Banks fine sand, 600 feet east and 2,750 feet south of the northwest corner of sec. 9, T. 20 N., R. 18 E.

A—0 to 3 inches; dark grayish brown (2.5Y 4/2) fine sand, very dark grayish brown (2.5Y 3/2) moist;

weak medium granular structure; loose; mildly alkaline; clear wavy boundary.

- C1—3 to 37 inches; multicolored stratified fine and coarse sand; single grain; loose; some thin layers of finer material; slight effervescence; moderately alkaline; gradual wavy boundary.
- C2—37 to 60 inches; grayish brown (2.5Y 5/2) fine sand, dark grayish brown (2.5Y 4/2) moist; single grain; loose; slight effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 0 to 10 inches

Depth to a contrasting or impervious layer: More than 60 inches

Other characteristics: A dark buried A horizon in some pedons

Belfield Series

Depth to bedrock: Deep

Drainage class: Well drained

Permeability: Slow

Landform: Plains

Parent material: Clayey residuum

Slope: 0 to 3 percent

Typical Pedon

Belfield silty clay loam, in an area of Belfield-Daglum complex, 0 to 3 percent slopes, 1,235 feet south and 70 feet west of the northeast corner of sec. 10, T. 21 N., R. 19 E.

- A—0 to 6 inches; dark grayish brown (10YR 4/2) silty clay loam, very dark brown (10YR 2/2) moist; moderate fine platy and moderate fine and medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; neutral; clear wavy boundary.
- B/E—6 to 10 inches; dark grayish brown (2.5Y 4/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; very thin light brownish gray (2.5Y 6/2) silt coatings on faces of peds; weak fine prismatic structure parting to moderate very fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; slightly acid; clear smooth boundary.
- Bt1—10 to 14 inches; dark grayish brown (2.5Y 4/2) silty clay, very dark grayish brown (2.5Y 3/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; very hard, firm, sticky and plastic; shiny films on faces of peds; neutral; clear smooth boundary.
- Bt2—14 to 20 inches; dark grayish brown (2.5Y 4/2) silty clay, very dark grayish brown (2.5Y 3/2) moist; weak medium prismatic structure parting to

moderate medium subangular blocky; very hard, firm, sticky and plastic; shiny films on faces of peds; neutral; clear wavy boundary.

- Bk1—20 to 24 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure parting to weak coarse subangular blocky; hard, firm, slightly sticky and slightly plastic; few fine accumulations of carbonate; strong effervescence; moderately alkaline; clear wavy boundary.
- Bk2—24 to 36 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak coarse subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few fine accumulations of carbonate; strong effervescence; moderately alkaline; clear wavy boundary.
- C—36 to 45 inches; grayish brown (2.5Y 5/2) silty clay loam, very dark grayish brown (2.5Y 3/2) moist; massive; hard, firm, slightly sticky and slightly plastic; few fine fragments of shale; strong effervescence; moderately alkaline; clear wavy boundary.
- Cr—45 to 60 inches; soft siltstone and shale bedrock.

Range in Characteristics

Thickness of the mollic epipedon: 7 to 24 inches

Depth to carbonates: 20 to 35 inches

Depth to a contrasting or impervious layer: 40 to more than 60 inches to soft siltstone and shale

Other characteristics: Surface soil 7 to 15 inches thick; an E horizon in some pedons; no Cr horizon in some pedons

Bryant Series

Depth to bedrock: Deep

Drainage class: Well drained

Permeability: Moderate

Landform: Dissected plains and other plains

Parent material: Loess

Slope: 0 to 9 percent

Typical Pedon

Bryant silt loam, 2 to 6 percent slopes, 200 feet east and 1,700 feet south of the northwest corner of sec. 13, T. 21 N., R. 29 E.

- Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak coarse subangular blocky structure parting to moderate fine and medium granular; slightly hard, very friable; neutral; abrupt smooth boundary.
- Bw1—6 to 14 inches; dark brown (10YR 4/3) silt loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate medium

subangular blocky; slightly hard, very friable; neutral; gradual smooth boundary.

Bw2—14 to 20 inches; olive brown (2.5Y 4/4) silt loam, dark grayish brown (2.5Y 4/2) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, very friable; neutral; abrupt wavy boundary.

Bk—20 to 34 inches; light brownish gray (2.5Y 6/2) silt loam, light olive brown (2.5Y 5/4) moist; weak coarse subangular blocky structure; slightly hard, very friable; few fine accumulations of carbonate; strong effervescence; moderately alkaline; abrupt wavy boundary.

C—34 to 60 inches; light yellowish brown (2.5Y 6/4) silt loam, olive brown (2.5Y 4/4) moist; massive; slightly hard, very friable; slight effervescence; moderately alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 7 to 16 inches

Depth to carbonates: 11 to 27 inches

Depth to a contrasting or impervious layer: More than 60 inches

Bullcreek Series

Depth to bedrock: Deep

Drainage class: Well drained and moderately well drained

Permeability: Very slow

Landform: Fans and terraces

Parent material: Clayey alluvium

Slope: 0 to 4 percent

Typical Pedon

Bullcreek clay, 0 to 4 percent slopes, 1,750 feet south and 748 feet east of the northwest corner of sec. 2, T. 18 N., R. 29 E.

A—0 to 1 inch; grayish brown (2.5Y 5/2) clay, very dark grayish brown (2.5Y 3/2) moist; moderate fine and medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; cracks 1 inch wide; slight effervescence; mildly alkaline; abrupt smooth boundary.

Bw—1 to 10 inches; grayish brown (2.5Y 5/2) clay, very dark grayish brown (2.5Y 3/2) moist; weak coarse subangular blocky structure parting to moderate medium angular blocky; extremely hard, very firm, sticky and plastic; few intersecting slickensides; cracks 1 inch wide; slight effervescence; mildly alkaline; gradual wavy boundary.

Bz—10 to 19 inches; grayish brown (2.5Y 5/2) clay, very dark grayish brown (2.5Y 3/2) moist; weak coarse subangular blocky structure parting to

moderate fine and medium angular blocky; extremely hard, very firm, sticky and plastic; few intersecting slickensides; cracks ½ inch wide; common very fine and fine accumulations of salts; slight effervescence; mildly alkaline; clear wavy boundary.

C—19 to 60 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; massive; extremely hard, firm, sticky and plastic; cracks ½ inch wide; few fine accumulations of carbonates; few fine accumulations of salts; slight effervescence; mildly alkaline.

Range in Characteristics

Depth to carbonates: 0 to more than 60 inches

Depth to a contrasting or impervious layer: More than 60 inches

Depth to gypsum and other salts: 6 to 20 inches

Bullock Series

Depth to bedrock: Moderately deep

Drainage class: Well drained

Permeability: Very slow

Landform: Dissected plains and other plains

Parent material: Clayey residuum

Slope: 0 to 25 percent

Typical Pedon

Bullock fine sandy loam, in an area of Evridge-Bullock fine sandy loams, 0 to 6 percent slopes, 2,500 feet east and 75 feet north of the southwest corner of sec. 9, T. 18 N., R. 19 E.

E—0 to 4 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium platy structure; soft, very friable; neutral; abrupt smooth boundary.

Bt—4 to 10 inches; grayish brown (2.5Y 5/2) sandy clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium columnar structure parting to moderate medium subangular blocky; hard, firm, slightly sticky and slightly plastic; shiny films on faces of peds; moderately alkaline; clear wavy boundary.

Bkz—10 to 15 inches; grayish brown (2.5Y 5/2) sandy loam, dark grayish brown (2.5Y 4/2) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; hard, friable, slightly sticky and slightly plastic; few fine accumulations of carbonate; few fine accumulations of salts; slight effervescence; strongly alkaline; clear wavy boundary.

C—15 to 23 inches; light brownish gray (2.5Y 6/2) clay loam, olive brown (2.5Y 4/4) moist; massive; hard,

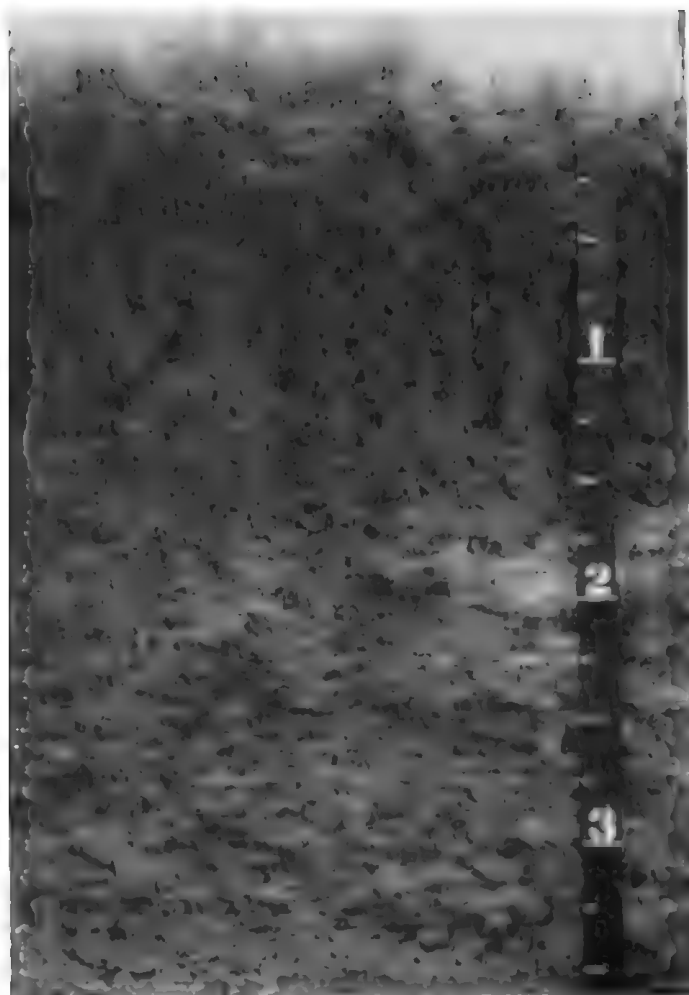


Figure 13.—Profile of Cabba loam. Weakly cemented sandstone is at a depth of about 12 inches, and bedded siltstone is at a depth of about 24 inches. Depth is marked in feet.

friable, slightly sticky and slightly plastic; few fine accumulations of salts; slight effervescence; strongly alkaline; clear wavy boundary.

Cr—23 to 60 inches; soft sandstone bedrock.

Range in Characteristics

Depth to carbonates: 5 to 11 inches

Depth to a contrasting or impervious layer: 20 to 40 inches to soft sandstone

Depth to gypsum and other salts: 5 to 15 inches

Thickness of the E horizon: 2 to 4 inches

Cabba Series

Depth to bedrock: Shallow (fig. 13)

Drainage class: Well drained

Permeability: Moderate

Landform: Dissected plains

Parent material: Loamy residuum

Slope: 3 to 60 percent

Typical Pedon

Cabba loam, in an area of Cabba-Reeder loams, 6 to 25 percent slopes, 60 feet east and 2,400 feet south of the northwest corner of sec. 5, T. 22 N., R. 19 E.

A—0 to 4 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; slightly hard, friable; slight effervescence; moderately alkaline; clear wavy boundary.

C—4 to 10 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; weak coarse subangular blocky structure; slightly hard, friable; common fine accumulations of carbonate; strong effervescence; moderately alkaline; gradual wavy boundary.

Cr1—10 to 32 inches; grayish brown (2.5Y 5/2), weakly cemented sandstone bedrock, dark grayish brown (2.5Y 4/2) moist; common fine yellowish brown (10YR 5/8) stains on bedding planes; slightly hard and brittle; common fine accumulations of carbonate; strong effervescence; moderately alkaline; clear wavy boundary.

Cr2—32 to 60 inches; soft siltstone bedrock.

Range in Characteristics

Depth to carbonates: 0 to 10 inches

Depth to a contrasting or impervious layer: 10 to 20 inches to soft sandstone and siltstone

Cohagen Series

Depth to bedrock: Shallow

Drainage class: Well drained

Permeability: Moderately rapid

Landform: Dissected plains

Parent material: Sandy residuum

Slope: 3 to 40 percent

Typical Pedon

Cohagen fine sandy loam, in an area of Cohagen-Weber fine sandy loams, 6 to 25 percent slopes, 200 feet west and 1,200 feet north of the southeast corner of sec. 19, T. 18 N., R. 25 E.

A—0 to 5 inches; dark brown (10YR 4/3) fine sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure parting to weak medium granular; soft, very friable; mildly alkaline; clear wavy boundary.

C—5 to 16 inches; dark yellowish brown (10YR 4/4) fine sandy loam, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure; soft, very friable; mildly alkaline; clear wavy boundary.

Cr—16 to 60 inches; soft, weakly cemented sandstone bedrock; few hard fragments of sandstone.

Range in Characteristics

Depth to carbonates: More than 60 inches

Depth to a contrasting or impervious layer: 10 to 20 inches to soft sandstone

The Cohagen soils in this county are outside the range for the series because they have lower color values and are leached of carbonates to a greater depth. These differences, however, do not significantly affect the use or behavior of the soils.

Daglum Series

Depth to bedrock: Deep

Drainage class: Well drained

Permeability: Very slow

Landform: Plains

Parent material: Clayey residuum

Slope: 0 to 9 percent

Typical Pedon

Daglum loam, 0 to 3 percent slopes, 1,600 feet north and 200 feet east of the southwest corner of sec. 36, T. 18 N., R. 26 E.

A—0 to 5 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak fine prismatic structure parting to weak fine granular; soft, friable; slightly acid; abrupt wavy boundary.

E—5 to 7 inches; light brownish gray (10YR 6/2) loam, grayish brown (10YR 5/2) moist; weak fine prismatic structure parting to weak thin platy; soft, friable; neutral; abrupt wavy boundary.

Bt1—7 to 10 inches; dark grayish brown (10YR 4/2) clay, very dark grayish brown (10YR 3/2) moist; strong medium columnar structure parting to moderate fine subangular blocky; very hard, very firm, sticky and plastic; shiny films on faces of peds; mildly alkaline; clear wavy boundary.

Bt2—10 to 16 inches; dark grayish brown (10YR 4/2) clay, very dark grayish brown (10YR 3/2) moist; moderate coarse prismatic structure parting to moderate fine and medium subangular blocky; very hard, very firm, sticky and plastic; shiny films on faces of peds; moderately alkaline; clear wavy boundary.

Bkz—16 to 25 inches; grayish brown (2.5Y 5/2) clay,

dark grayish brown (2.5Y 4/2) moist; weak coarse subangular blocky structure; hard, firm, sticky and plastic; common fine accumulations of carbonate; few fine accumulations of salts; strong effervescence; moderately alkaline; gradual smooth boundary.

Cz—25 to 36 inches; grayish brown (2.5Y 5/2) clay loam, very dark grayish brown (2.5Y 3/2) moist; massive; hard, firm, sticky and plastic; common fine accumulations of salts; strong effervescence; moderately alkaline; clear wavy boundary.

C—36 to 60 inches; light olive brown (2.5Y 5/4) clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, sticky and plastic; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 16 to 32 inches

Depth to a contrasting or impervious layer: 40 to more than 60 inches to shale

Depth to gypsum and other salts: 16 to 32 inches

Other characteristics: Surface soil 5 to 15 inches thick; soft siltstone in some pedons; shale or sandstone at a depth of 40 to 60 inches

Dupree Series

Depth to bedrock: Shallow

Drainage class: Well drained

Permeability: Very slow

Landform: Dissected plains

Parent material: Clayey residuum

Slope: 2 to 30 percent

Typical Pedon

Dupree clay, in an area of Dupree-Rock outcrop complex, 6 to 30 percent slopes, 1,900 feet west and 1,000 feet south of the northeast corner of sec. 12, T. 19 N., R. 27 E.

A—0 to 3 inches; gray (10YR 5/1) clay, dark gray (10YR 4/1) moist; weak medium subangular blocky structure parting to moderate fine granular; extremely hard, very firm, very sticky and plastic; slightly acid; clear wavy boundary.

Bw1—3 to 8 inches; gray (10YR 5/1) clay, dark gray (10YR 4/1) moist; weak coarse prismatic structure parting to moderate coarse and medium subangular blocky; extremely hard, very firm, very sticky and plastic; few fine fragments of shale; slightly acid; gradual wavy boundary.

Bw2—8 to 15 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; weak coarse subangular blocky structure; extremely hard, very

firm, very sticky and plastic; about 15 percent fine fragments of shale; slightly acid; clear wavy boundary.

Cr—15 to 60 inches; bedded shale bedrock; shale can be easily dug with a spade, but plates are hard and brittle when dry.

Range in Characteristics

Depth to a contrasting or impervious layer: 10 to 20 inches to shale

Other characteristics: A C horizon in some pedons; slight effervescence in some pedons, but commonly no free carbonates within a depth of 60 inches

Ekalaka Series

Depth to bedrock: Deep

Drainage class: Well drained

Permeability: Slow

Landform: Plains

Parent material: Alluvium or residuum

Slope: 0 to 6 percent

Typical Pedon

Ekalaka very fine sandy loam, 0 to 6 percent slopes, 800 feet west and 320 feet north of the southeast corner of sec. 18, T. 19 N., R. 25 E.

A1—0 to 5 inches; dark grayish brown (10YR 4/2) very fine sandy loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable; neutral; clear smooth boundary.

A2—5 to 13 inches; dark grayish brown (10YR 4/2) very fine sandy loam, very dark brown (10YR 2/2) moist; weak coarse subangular blocky structure parting to weak fine granular; soft, very friable; slightly acid; clear smooth boundary.

E—13 to 19 inches; grayish brown (2.5Y 5/2) very fine sandy loam, very dark grayish brown (2.5Y 3/2) moist; weak very fine platy structure parting to weak fine granular; soft, very friable; moderately alkaline; abrupt wavy boundary.

Bt1—19 to 23 inches; light olive brown (2.5Y 5/4) fine sandy loam, olive brown (2.5Y 4/4) moist; strong medium and coarse columnar structure parting to moderate medium subangular blocky; extremely hard, very firm; shiny films on faces of peds; moderately alkaline; clear smooth boundary.

Bt2—23 to 26 inches; light olive brown (2.5Y 5/4) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; extremely hard, firm; shiny films on faces of peds; few fine accumulations of carbonate in root channels;

strongly alkaline; abrupt wavy boundary.

Bz—26 to 45 inches; light olive brown (2.5Y 5/4) fine sandy loam, olive brown (2.5Y 4/4) moist; common fine and medium distinct light olive brown (2.5Y 5/4) mottles; weak coarse subangular blocky structure; slightly hard, friable; many fine accumulations of carbonate; few fine accumulations of salts; noncalcareous matrix; slight effervescence; strongly alkaline; clear smooth boundary.

Cr—45 to 60 inches; soft, weakly cemented sandstone bedrock.

Range in Characteristics

Thickness of the mollic epipedon: 7 to 20 inches

Depth to carbonates: 26 to 60 inches

Depth to a contrasting or impervious layer: 40 to more than 60 inches to soft sandstone

Other characteristics: Surface soil 5 to 20 inches thick; a C horizon in some pedons

Evridge Series

Depth to bedrock: Moderately deep

Drainage class: Well drained

Permeability: Moderately rapid in the upper part and slow in the subsoil and underlying material

Landform: Plains

Parent material: Residuum

Slope: 0 to 6 percent

Typical Pedon

Evridge fine sandy loam, in an area of Evridge-Parchin fine sandy loams, 0 to 6 percent slopes, 1,950 feet east and 100 feet north of the southwest corner of sec. 12, T. 18 N., R. 19 E.

A1—0 to 7 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak coarse subangular blocky structure; soft, very friable; slightly acid; gradual wavy boundary.

A2—7 to 18 inches; dark grayish brown (10YR 4/2) loamy fine sand, very dark grayish brown (10YR 3/2) moist; weak coarse subangular blocky structure parting to weak fine granular; soft, very friable, neutral; clear wavy boundary.

E—18 to 23 inches; grayish brown (2.5Y 5/2) loamy fine sand, dark grayish brown (2.5Y 4/2) moist; weak coarse subangular blocky structure parting to weak coarse platy; soft, very friable; mildly alkaline; clear wavy boundary.

Bt—23 to 28 inches; grayish brown (2.5Y 5/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; moderate coarse columnar structure parting to weak

coarse subangular blocky; slightly hard, friable; shiny films on faces of peds; moderately alkaline; abrupt wavy boundary.

Bk—28 to 38 inches; light olive gray (5Y 6/2) fine sandy loam, grayish brown (2.5Y 5/2) moist; weak fine subangular blocky structure; slightly hard, friable; common fine and medium accumulations of carbonate; 70 percent weathered fragments of sandstone, easily crushed; strong effervescence; strongly alkaline; gradual wavy boundary.

Cr—38 to 60 inches; soft, weakly cemented sandstone bedrock.

Range in Characteristics

Depth to carbonates: 24 to 40 inches

Depth to a contrasting or impervious layer: 20 to 40 inches to soft sandstone

Other characteristics: Surface soil 13 to 33 inches thick

Farnuf Series

Depth to bedrock: Deep

Drainage class: Well drained

Permeability: Moderate

Landform: Terraces

Parent material: Alluvium

Slope: 0 to 6 percent

Typical Pedon

Farnuf loam, 2 to 6 percent slopes, 1,700 feet west and 2,500 feet north of the southeast corner of sec. 4, T. 19 N., R. 29 E.

A—0 to 5 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to moderate fine granular; slightly hard, friable; neutral; clear wavy boundary.

Bt—5 to 14 inches; dark brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; strong medium prismatic structure parting to strong medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; shiny thin films on faces of peds; neutral; clear wavy boundary.

Bk1—14 to 23 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium prismatic structure parting to weak medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common fine accumulations of carbonate; strong effervescence; moderately alkaline; gradual wavy boundary.

Bk2—23 to 41 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; weak medium prismatic structure; slightly hard, friable;

few fine accumulations of carbonate; strong effervescence; moderately alkaline; gradual wavy boundary.

C—41 to 60 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, slightly sticky; few fine accumulations of carbonate; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 10 to 25 inches

Depth to a contrasting or impervious layer: More than 60 inches

Flasher Series

Depth to bedrock: Shallow

Drainage class: Somewhat excessively drained

Permeability: Rapid

Landform: Dissected plains

Parent material: Sandy residuum

Slope: 15 to 60 percent

Typical Pedon

Flasher fine sandy loam, in an area of Flasher-Telfer complex, 15 to 40 percent slopes, 1,650 feet east and 690 feet south of the northwest corner of sec. 29, T. 19 N., R. 26 E.

A—0 to 4 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable; mildly alkaline; clear wavy boundary.

C—4 to 9 inches; olive brown (2.5Y 4/4) loamy fine sand, dark yellowish brown (10YR 3/4) moist; massive parting to single grain; soft, loose; few hard fragments of sandstone; mildly alkaline; clear wavy boundary.

Cr—9 to 60 inches; soft, weakly cemented sandstone bedrock.

Range in Characteristics

Depth to carbonates: 0 to 60 inches

Depth to a contrasting or impervious layer: 7 to 20 inches to soft sandstone

Glenross Series

Depth to bedrock: Deep

Drainage class: Poorly drained

Permeability: Slow

Landform: Plains

Parent material: Alluvium

Slope: 0 to 1 percent

Typical Pedon

Glenross fine sandy loam, 70 feet east and 1,000 feet north of the southwest corner of sec. 26, T. 18 N., R. 24 E.

E—0 to 1 inch; light brownish gray (10YR 6/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak thin platy structure; soft, very friable; slight effervescence; strongly alkaline; abrupt smooth boundary.

Btg—1 to 6 inches; grayish brown (2.5Y 5/2) sandy clay loam, dark grayish brown (2.5Y 4/2) moist; few fine and medium distinct light olive brown (2.5Y 5/6) mottles; moderate medium columnar structure parting to weak fine and medium subangular blocky; hard, friable, sticky and plastic; shiny films on faces of peds; strong effervescence; very strongly alkaline; clear wavy boundary.

Bzg1—6 to 15 inches; olive (5Y 5/4) sandy clay loam, grayish brown (2.5Y 5/2) moist; common fine and medium faint strong brown (7.5YR 5/6) mottles; weak very coarse and coarse prismatic structure parting to weak very coarse and coarse subangular blocky; hard, friable, sticky and plastic; few fine accumulations of salts; strong effervescence; very strongly alkaline; clear wavy boundary.

Bzg2—15 to 37 inches; pale olive (5Y 6/3) sandy clay loam, olive (5Y 5/3) moist; many medium and coarse faint strong brown (7.5YR 5/6) mottles; weak very coarse and coarse subangular blocky structure; hard, friable, sticky and plastic; few fine accumulations of salts; slight effervescence; very strongly alkaline; clear wavy boundary.

Cg—37 to 60 inches; light olive gray (5Y 6/2) fine sandy loam, olive gray (5Y 5/2) moist; few fine and medium faint light olive brown (2.5Y 5/6) mottles; hard, friable; slight effervescence; very strongly alkaline.

Range in Characteristics

Depth to carbonates: 0 to 2 inches

Depth to a contrasting or impervious layer: More than 60 inches

Other characteristics: An E horizon ½ inch to 2 inches thick

Grail Series

Depth to bedrock: Deep

Drainage class: Well drained

Permeability: Moderately slow

Landform: Plains

Parent material: Alluvium

Slope: 0 to 2 percent

Typical Pedon

Grail silty clay loam, 1,000 feet east and 250 feet south of the northwest corner of sec. 26, T. 23 N., R. 17 E.

A—0 to 8 inches; dark gray (10YR 4/1) silty clay loam, very dark gray (10YR 3/1) moist; weak medium and coarse subangular blocky structure parting to weak fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; neutral; clear wavy boundary.

Bt—8 to 20 inches; dark grayish brown (2.5Y 4/2) silty clay, very dark grayish brown (2.5Y 3/2) moist; moderate coarse prismatic structure parting to strong fine and medium angular blocky; very hard, firm, sticky and plastic; shiny films on faces of peds; neutral; gradual wavy boundary.

Bk—20 to 39 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure parting to fine and medium angular blocky; very hard, firm, sticky and plastic; few fine accumulations of carbonate; slight effervescence; moderately alkaline; gradual wavy boundary.

C—39 to 60 inches; olive brown (2.5Y 4/4) silty clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, slightly sticky and slightly plastic; strong effervescence; moderately alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 16 to 40 inches

Depth to carbonates: 15 to 40 inches

Depth to a contrasting or impervious layer: More than 60 inches

Other characteristics: No free carbonates in the C horizon in some pedons; bedded shale bedrock at a depth of 40 to 60 inches in some pedons

The Grail soils in this county have chroma in the A horizon that are lower than those defined as the range for the series. This difference, however, does not significantly affect the use or behavior of the soils.

Grassna Series

Depth to bedrock: Deep

Drainage class: Well drained

Permeability: Moderate

Landform: Plains

Parent material: Loess

Slope: 0 to 2 percent

Typical Pedon

Grassna silt loam, 150 feet east and 750 feet north of the southwest corner of sec. 19, T. 22 N., R. 30 E.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam, black (10YR 2/1) moist; moderate medium subangular blocky structure parting to strong fine granular; slightly hard, friable; neutral; clear abrupt boundary.

A—8 to 17 inches; very dark gray (10YR 3/1) silt loam, black (10YR 2/1) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, friable; neutral; gradual smooth boundary.

Bw1—17 to 27 inches; very dark grayish brown (10YR 3/2) silt loam, very dark brown (10YR 2/2) moist; weak coarse prismatic structure parting to moderate coarse subangular blocky; slightly hard, friable; neutral; gradual wavy boundary.

Bw2—27 to 37 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak coarse prismatic structure parting to weak coarse subangular blocky; slightly hard, friable; neutral; clear smooth boundary.

BC—37 to 51 inches; grayish brown (2.5Y 5/2) silt loam, very dark grayish brown (2.5Y 3/2) moist; weak coarse subangular blocky structure; slightly hard, friable; neutral; clear smooth boundary.

Ab—51 to 60 inches; dark brown (10YR 4/3) silt loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable; neutral.

Range in Characteristics

Thickness of the mollic epipedon: 16 to 60 inches

Depth to carbonates: 15 to more than 60 inches

Depth to a contrasting or impervious layer: More than 60 inches

The Grassna soils in this county are outside the range for the series because they have lower chroma in the A horizon and are leached of carbonates to a greater depth. These differences, however, do not significantly affect the use or behavior of the soils.

Harriet Series

Depth to bedrock: Deep

Drainage class: Poorly drained

Permeability: Very slow

Landform: Flood plains

Parent material: Clayey alluvium

Slope: 0 to 1 percent

Typical Pedon

Harriet loam, 425 feet south and 300 feet west of the northeast corner of sec. 33, T. 22 N., R. 18 E.

E—0 to 3 inches; gray (10YR 5/1) loam, very dark gray (10YR 3/1) moist; weak fine platy structure parting

to weak fine granular; soft, friable; neutral; abrupt wavy boundary.

Btz1—3 to 9 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium and coarse columnar structure parting to moderate medium subangular blocky; hard, firm, slightly sticky and slightly plastic; shiny films on faces of peds; few fine accumulations of salts; slight effervescence; moderately alkaline; clear wavy boundary.

Btz2—9 to 18 inches; grayish brown (10YR 5/2) clay, dark grayish brown (10YR 4/2) moist; moderate coarse prismatic structure parting to weak coarse subangular blocky; extremely hard, very firm, sticky and plastic; shiny films on faces of peds; few fine accumulations of salts; strong effervescence; strongly alkaline; gradual wavy boundary.

Btkz—18 to 22 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure parting to coarse subangular blocky; extremely hard, very firm, sticky and plastic; shiny thin films on faces of peds; common medium accumulations of carbonate; few fine accumulations of salts; strong effervescence; strongly alkaline; clear wavy boundary.

Bkz—22 to 40 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak coarse subangular blocky structure; extremely hard, firm, slightly sticky and slightly plastic; few medium accumulations of carbonate; few fine accumulations of salts; strong effervescence; strongly alkaline; clear wavy boundary.

C—40 to 60 inches; grayish brown (2.5Y 5/2) sandy clay loam, dark grayish brown (2.5Y 4/2) moist; massive; extremely hard, firm, slightly sticky and slightly plastic; few medium to coarse accumulations of salts; strong effervescence; strongly alkaline.

Range in Characteristics

Depth to carbonates: 1 to 5 inches

Depth to a contrasting or impervious layer: More than 60 inches

Depth to gypsum and other salts: 4 to 11 inches

Other characteristics: A dark A horizon 1 to 2 inches thick in some pedons; an E horizon 1 to 5 inches thick; a C horizon in some pedons

Havrelon Series

Depth to bedrock: Deep

Drainage class: Well drained

Permeability: Moderate

Landform: Flood plains and terraces

Parent material: Alluvium

Slope: 0 to 4 percent

Typical Pedon

Havrelon loam, 3,000 feet north and 2,800 feet west of the southeast corner of sec. 4, T. 20 N., R. 24 E.

A1—0 to 2 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, friable; neutral; clear wavy boundary.

A2—2 to 4 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium granular structure; slightly hard, friable; mildly alkaline; clear wavy boundary.

A3—4 to 11 inches; grayish brown (2.5Y 5/2) silt loam, dark grayish brown (2.5Y 4/2) moist; weak medium granular structure; slightly hard, friable; slight effervescence; mildly alkaline; clear wavy boundary.

C1—11 to 18 inches; grayish brown (2.5Y 5/2) silt loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, friable; thin layers of fine sandy loam; slight effervescence; mildly alkaline; abrupt wavy boundary.

C2—18 to 28 inches; grayish brown (2.5Y 5/2) loam, very dark grayish brown (2.5Y 3/2) moist; massive; soft, very friable; slight effervescence; mildly alkaline; clear wavy boundary.

C3—28 to 42 inches; grayish brown (10YR 5/2) loam, dark grayish brown (2.5Y 4/2) moist; massive; soft, very friable; slight effervescence; mildly alkaline; clear wavy boundary.

C4—42 to 60 inches; light brownish gray (10YR 6/2) very fine sandy loam, grayish brown (10YR 5/2) moist; massive; soft, very friable; slight effervescence; mildly alkaline.

Range in Characteristics

Depth to carbonates: 0 to 8 inches

Depth to a contrasting or impervious layer: More than 60 inches

Heil Series

Depth to bedrock: Deep

Drainage class: Poorly drained

Permeability: Very slow

Landform: Plains

Parent material: Clayey alluvium

Slope: 0 to 1 percent

Typical Pedon

Heil silt loam, 1,980 feet north and 50 feet west of the southeast corner of sec. 34, T. 19 N., R. 24 E.

E—0 to 2 inches; gray (10YR 5/1) silt loam, very dark gray (10YR 3/1) moist; weak fine subangular blocky and weak fine granular structure; soft, very friable; medium acid; abrupt wavy boundary.

Bt1—2 to 6 inches; dark gray (10YR 4/1) clay, very dark gray (10YR 3/1) moist; thin gray (10YR 6/1) coatings on top of columns; moderate medium columnar structure parting to moderate medium subangular blocky; extremely hard, very firm, sticky and plastic; shiny films on faces of peds; neutral; clear wavy boundary.

Bt2—6 to 18 inches; dark gray (10YR 4/1) clay, very dark gray (10YR 3/1) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; very hard, very firm, sticky and plastic; shiny films on faces of peds; strongly alkaline; clear wavy boundary.

Bkz—18 to 27 inches; gray (5Y 5/1) clay, dark gray (5Y 4/1) moist; weak coarse prismatic structure parting to coarse subangular blocky; very hard, very firm, sticky and plastic; common fine and medium accumulations of carbonate; few fine accumulations of salts; strong effervescence; moderate alkaline; gradual wavy boundary.

Bkzg—27 to 33 inches; olive gray (5Y 5/2) clay, olive gray (5Y 4/2) moist; few fine distinct olive (5Y 4/4) mottles; weak coarse subangular blocky structure; very hard, very firm, sticky and plastic; common fine and medium accumulations of carbonate; few fine accumulations of salts; strong effervescence; strongly alkaline; gradual wavy boundary.

Cg1—33 to 41 inches; olive gray (5Y 5/2) clay, olive gray (5Y 4/2) moist; common fine and medium distinct olive (5Y 4/4) mottles; massive; very hard, very firm, sticky and plastic; strong effervescence; strongly alkaline; gradual wavy boundary.

Cg2—41 to 60 inches; light olive gray (5Y 6/2) clay loam, olive gray (5Y 4/2) moist; common fine and medium distinct olive (5Y 4/4) mottles; massive; hard, friable, sticky and plastic; strong effervescence; strongly alkaline.

Range in Characteristics

Depth to carbonates: 15 to 38 inches

Depth to a contrasting or impervious layer: More than 60 inches

Other characteristics: An E horizon 1 to 4 inches thick

Hurley Series

Depth to bedrock: Moderately deep

Drainage class: Well drained and moderately well drained

Permeability: Very slow

Landform: Plains

Parent material: Clayey residuum

Slope: 0 to 9 percent

Typical Pedon

Hurley silt loam, 0 to 9 percent slopes, 990 feet north and 1,650 feet west of the southeast corner of sec. 33, T. 19 N., R. 29 E.

E—0 to 2 inches; grayish brown (2.5Y 5/2) silt loam, very dark grayish brown (2.5Y 3/2) moist; weak fine platy and subangular blocky structure parting to moderate fine granular; slightly hard, friable; neutral; clear wavy boundary.

Bt—2 to 10 inches; dark grayish brown (2.5Y 4/2) clay, very dark grayish brown (2.5Y 3/2) moist; strong medium columnar structure parting to moderate fine and medium subangular blocky; extremely hard, firm, sticky and plastic; thin gray (10YR 6/1) coatings on top of columns; shiny films on faces of peds; mildly alkaline; gradual wavy boundary.

Btkz—10 to 15 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate medium subangular blocky structure; extremely hard, firm, sticky and plastic; shiny films on faces of peds; few fine accumulations of carbonate; few fine accumulations of salts; slight effervescence; moderately alkaline; clear wavy boundary.

Bkz—15 to 25 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; weak subangular blocky structure; very hard, firm, sticky and plastic; few fine accumulations of carbonate; few fine accumulations of salts; strong effervescence; moderately alkaline; clear wavy boundary.

C—25 to 30 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; horizontal bedding planes; very hard, firm, sticky and plastic; about 50 percent fine fragments of soft shale; strong effervescence; moderately alkaline; clear wavy boundary.

Cr—30 to 60 inches; bedded shale bedrock; shale can be dug with a spade, but plates are hard and brittle when dry.

Range in Characteristics

Depth to carbonates: 4 to 12 inches

Depth to a contrasting or impervious layer: 20 to 40 inches to shale

Depth to gypsum and other salts: 4 to 16 inches

Other characteristics: An E horizon 1 to 4 inches thick

Korchea Series

Depth to bedrock: Deep

Drainage class: Well drained

Permeability: Moderate

Landform: Flood plains

Parent material: Alluvium

Slope: 0 to 2 percent

Typical Pedon

Korchea loam, channeled, 150 feet south and 2,000 feet west of the northeast corner of sec. 29, T. 22 N., R. 18 E.

A—0 to 9 inches; dark grayish brown (10YR 4/2), stratified loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to moderate fine granular; slightly hard, friable; slight effervescence; mildly alkaline; clear smooth boundary.

C1—9 to 17 inches; dark grayish brown (10YR 4/2), stratified loam, very dark grayish brown (10YR 3/2) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable; strong effervescence; mildly alkaline; gradual smooth boundary.

C2—17 to 30 inches; dark grayish brown (10YR 4/2), stratified loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, friable; slight effervescence; mildly alkaline; clear smooth boundary.

C3—30 to 44 inches; dark grayish brown (2.5Y 4/2) clay loam, very dark grayish brown (2.5Y 3/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common fine accumulations of carbonate; strong effervescence; moderately alkaline; gradual smooth boundary.

C4—44 to 60 inches; olive brown (2.5Y 4/4) clay loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine accumulations of carbonate; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 0 to 6 inches

Depth to a contrasting or impervious layer: More than 60 inches

Lallie Series

Depth to bedrock: Deep

Drainage class: Poorly drained

Permeability: Slow

Landform: Flood plains

Parent material: Clayey alluvium

Slope: 0 to 2 percent

Typical Pedon

Lallie silty clay loam, 2,000 feet west and 180 feet north of the southeast corner of sec. 26, T. 22 N., R. 28 E.

- A—0 to 2 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; slight effervescence; moderately alkaline; gradual wavy boundary.
- Czg1—2 to 7 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak coarse subangular blocky structure; hard, firm, sticky and plastic; few fragments of shale; common fine accumulations of carbonate; common fine accumulations of salts; strong effervescence; moderately alkaline; clear wavy boundary.
- Czg2—7 to 12 inches; light brownish gray (5Y 6/2) clay, dark grayish brown (5Y 4/2) moist; weak coarse subangular blocky structure; hard, firm, sticky and plastic; common fine accumulations of carbonate; common fine accumulations of salts; few fragments of shale; slight effervescence; moderately alkaline; gradual wavy boundary.
- Czg3—12 to 23 inches; light olive gray (5Y 6/2) clay, olive gray (5Y 4/2) moist; massive; hard, firm, sticky and plastic; few fine accumulations of salts; common fragments of shale; slight effervescence; strongly alkaline; gradual wavy boundary.
- Czg4—23 to 32 inches; olive gray (5Y 5/2) clay, olive gray (5Y 4/2) moist; massive; extremely hard, very firm, sticky and plastic; few fine and medium accumulations of salts; strong effervescence; strongly alkaline; gradual wavy boundary.
- Czg5—32 to 60 inches; olive gray (5Y 5/2) clay, olive gray (5Y 4/2) moist; massive; common fine distinct yellowish brown (10YR 5/6) and gray (2.5Y 5/0) mottles; massive; extremely hard, very firm, sticky and plastic; few fine accumulations of salts; slight effervescence; strongly alkaline.

Range in Characteristics

Depth to carbonates: 0 to 10 inches

Depth to a contrasting or impervious layer: More than 60 inches

Lehr Series

Depth to bedrock: Deep

Drainage class: Somewhat excessively drained

Permeability: Moderately rapid in the subsoil and very rapid in the underlying gravelly sand

Landform: Terraces

Parent material: Alluvium

Slope: 0 to 6 percent

Typical Pedon

Lehr loam, 2 to 6 percent slopes, 105 feet east and 1,710 feet north of the southwest corner of sec. 19, T. 20 N., R. 20 E.

- A—0 to 6 inches; dark brown (10YR 4/3) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to moderate medium granular; slightly hard, very friable; neutral; clear smooth boundary.
- Bw1—6 to 11 inches; dark brown (10YR 4/3) loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable; neutral; clear wavy boundary.
- Bw2—11 to 17 inches; brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; weak medium prismatic structure parting to weak medium subangular blocky; hard, friable; neutral; clear wavy boundary.
- 2C1—17 to 30 inches; multicolored gravelly loamy coarse sand; single grain; loose; about 25 percent gravel; some pebbles having thin accumulations of carbonate on undersides; strong effervescence; moderately alkaline; abrupt wavy boundary.
- C2—30 to 60 inches; multicolored very gravelly sand; single grain; loose; about 40 percent gravel; some pebbles having thin accumulations of carbonate on undersides; strong effervescence; moderately alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 7 to 16 inches

Depth to carbonates: 10 to 20 inches

Depth to a contrasting or impervious layer: 14 to 20 inches to sand and gravel

McKenzie Series

Depth to bedrock: Deep

Drainage class: Poorly drained

Permeability: Very slow

Landform: Plains

Parent material: Clayey alluvium

Slope: 0 to 1 percent

Typical Pedon

McKenzie clay, 2,400 feet west and 575 feet south of the northeast corner of sec. 34, T. 22 N., R. 18 E.

A—0 to 3 inches; gray (5Y 5/1) clay, dark gray (5Y 4/1) moist; light gray (5Y 7/1) crust on the surface; fine and medium subangular blocky structure; extremely hard, very firm, sticky and plastic; moderately alkaline; clear smooth boundary.

Bg1—3 to 9 inches; gray (5Y 5/1) clay, dark gray (5Y 4/1) moist; weak very coarse prismatic structure; extremely hard, very firm, sticky and plastic; strong effervescence; strongly alkaline; clear wavy boundary.

Bg2—9 to 23 inches; olive gray (5Y 5/2) clay, gray

(5Y 5/1) moist; weak coarse subangular blocky structure; extremely hard, very firm, sticky and plastic; few slickensides; few fine accumulations of salts; strong effervescence; strongly alkaline; clear wavy boundary.

Cg1—23 to 36 inches; olive gray (5Y 5/2) clay, gray (5Y 5/1) moist; few fine distinct yellowish brown (10YR 5/6) mottles; massive; extremely hard, very firm, sticky and plastic; few fine accumulations of salts; strong effervescence; strongly alkaline; clear wavy boundary.

Cg2—36 to 60 inches; light olive gray (5Y 6/2) clay, olive gray (5Y 5/2) moist; common fine and medium distinct yellowish brown (10YR 5/6) mottles; massive; extremely hard, very firm, sticky and plastic; strong effervescence; strongly alkaline.

Range in Characteristics

Depth to carbonates: 0 to 5 inches

Depth to a contrasting or impervious layer: More than 60 inches

Opal Series

Depth to bedrock: Moderately deep

Drainage class: Well drained

Permeability: Very slow

Landform: Dissected plains

Parent material: Clayey residuum

Slope: 0 to 25 percent

Typical Pedon

Opal clay, 6 to 9 percent slopes, 2,800 feet south and 1,400 feet west of the northeast corner of sec. 32, T. 19 N., R. 29 E.

A—0 to 4 inches; dark grayish brown (10YR 4/2) clay, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to fine and medium granular; slightly hard, firm, sticky and plastic; mildly alkaline; clear wavy boundary.

Bw1—4 to 16 inches; dark grayish brown (2.5Y 4/2) clay, very dark grayish brown (2.5Y 3/2) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; very hard, very firm, sticky and plastic; few intersecting slickensides; slight effervescence; moderately alkaline; gradual wavy boundary.

Bw2—16 to 22 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; weak coarse blocky structure parting to moderate medium blocky; very hard, very firm, sticky and plastic; few intersecting slickensides; strong effervescence; moderately alkaline; gradual wavy boundary.

C1—22 to 26 inches; light brownish gray (2.5Y 6/2) clay, grayish brown (2.5Y 5/2) moist; massive; hard, firm, sticky and plastic; few fine stains (iron and manganese oxide); about 30 percent fragments of shale; strong effervescence; moderately alkaline; clear wavy boundary.

C2—26 to 36 inches; light brownish gray (2.5Y 6/2) clay, grayish brown (2.5Y 5/2) moist; massive; hard, firm, sticky and plastic; few fine stains (iron and manganese oxide); about 50 percent fragments of shale; slight effervescence; moderately alkaline; clear wavy boundary.

Cr—36 to 60 inches; bedded shale bedrock; shale can be easily dug with a spade, but plates are hard and brittle when dry.

Range in Characteristics

Thickness of the mollic epipedon: 8 to 20 inches

Depth to carbonates: 4 to 8 inches

Depth to a contrasting or impervious layer: 20 to 40 inches to shale

Parchin Series

Depth to bedrock: Moderately deep

Drainage class: Well drained

Permeability: Slow

Landform: Dissected plains and other plains

Parent material: Residuum

Slope: 0 to 9 percent

Typical Pedon

Parchin fine sandy loam, in an area of Bullock-Parchin fine sandy loams, 0 to 9 percent slopes, 2,150 feet west and 80 feet south of the northeast corner of sec. 14, T. 18 N., R. 19 E.

A—0 to 6 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure parting to weak fine granular; soft, very friable; slightly acid; clear wavy boundary.

E—6 to 10 inches; grayish brown (10YR 5/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure parting to weak fine granular; soft, very friable; neutral; abrupt wavy boundary.

Bt—10 to 17 inches; brown (10YR 5/3) sandy clay loam, dark grayish brown (10YR 4/2) moist; moderate fine and medium columnar structure parting to moderate fine and medium subangular blocky; extremely hard, firm; shiny films on faces of peds; moderately alkaline; clear wavy boundary.

Bk—17 to 24 inches; brown (10YR 5/3) fine sandy

loam, dark grayish brown (10YR 4/2) moist; weak medium and coarse prismatic structure parting to weak medium subangular blocky; very hard, friable; common fine and medium accumulations of carbonate; strong effervescence; strongly alkaline; gradual wavy boundary.

Cr1—24 to 29 inches; soft, weakly cemented sandstone bedrock that is stratified with lenses of loamy material.

Cr2—29 to 60 inches; soft, weakly cemented sandstone bedrock.

Range in Characteristics

Depth to carbonates: 13 to 25 inches

Depth to a contrasting or impervious layer: 20 to 40 inches to soft sandstone

Other characteristics: Surface soil 4 to 13 inches thick

Parshall Series

Depth to bedrock: Deep

Drainage class: Well drained

Permeability: Moderately rapid

Landform: Plains

Parent material: Alluvium

Slope: 0 to 6 percent

Typical Pedon

Parshall fine sandy loam, 0 to 6 percent slopes, 585 feet north and 35 feet west of the southeast corner of sec. 36, T. 18 N., R. 25 E.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) fine sandy loam, very dark brown (10YR 2/2) moist; weak medium and coarse subangular blocky structure; soft, very friable; neutral; abrupt smooth boundary.

A—7 to 11 inches; very dark grayish brown (10YR 3/2) fine sandy loam, very dark brown (10YR 2/2) moist; weak coarse subangular blocky structure; soft, very friable; neutral; clear smooth boundary.

Bw—11 to 30 inches; dark brown (10YR 4/3) fine sandy loam, dark brown (10YR 3/3) moist; weak coarse prismatic structure parting to weak coarse subangular blocky; soft, very friable; neutral; clear smooth boundary.

C1—30 to 41 inches; dark yellowish brown (10YR 4/4) fine sandy loam, dark yellowish brown (10YR 3/4) moist; weak coarse subangular blocky structure; soft, very friable; mildly alkaline; clear smooth boundary.

C2—41 to 60 inches; light olive brown (2.5Y 5/4) fine sandy loam, olive brown (2.5Y 4/4) moist; massive; soft, very friable; mildly alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 16 to 38 inches

Depth to carbonates: 20 to 60 inches

Depth to a contrasting or impervious layer: More than 60 inches

Other characteristics: A buried A horizon below a depth of 40 inches in some pedons

Promise Series

Depth to bedrock: Deep

Drainage class: Well drained

Permeability: Very slow

Landform: Plains

Parent material: Clayey residuum

Slope: 0 to 6 percent

Typical Pedon

Promise clay, 0 to 2 percent slopes, 1,600 feet south and 2,050 feet east of the northwest corner of sec. 27, T. 20 N., R. 29 E.

A1—0 to 4 inches; dark grayish brown (2.5Y 4/2) clay, very dark grayish brown (2.5Y 3/2) moist; weak medium subangular blocky structure parting to weak medium granular; hard, firm, sticky and plastic; neutral; clear wavy boundary.

A2—4 to 9 inches; dark grayish brown (2.5Y 4/2) clay, very dark grayish brown (2.5Y 3/2) moist; weak medium subangular blocky structure parting to moderate medium granular; hard, firm, sticky and plastic; slight effervescence; mildly alkaline; gradual wavy boundary.

Bw1—9 to 23 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate medium prismatic structure parting to moderate medium blocky; very hard, very firm, sticky and plastic; few intersecting slickensides; slight effervescence; moderately alkaline; gradual wavy boundary.

Bw2—23 to 26 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate medium prismatic structure parting to moderate medium blocky; very hard, very firm, sticky and plastic; few intersecting slickensides; slight effervescence; moderately alkaline; clear wavy boundary.

Bk—26 to 34 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; weak coarse subangular blocky structure; very hard, very firm, sticky and plastic; few intersecting slickensides; common fine accumulations of carbonate; strong effervescence; moderately alkaline; gradual wavy boundary.

Cz—34 to 60 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, sticky and plastic; few fine accumulations of carbonate; few fine nests of salts; strong effervescence; moderately alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 7 to 17 inches

Depth to carbonates: 4 to 15 inches

Depth to a contrasting or impervious layer: 40 to more than 60 inches to shale

Other characteristics: Bedded shale or coarser material at a depth of more than 40 inches in some pedons

Reeder Series

Depth to bedrock: Moderately deep

Drainage class: Well drained

Permeability: Moderate

Landform: Dissected plains

Parent material: Loamy residuum

Slope: 0 to 9 percent

Typical Pedon

Reeder loam, in an area of Reeder-Cabba loams, 3 to 6 percent slopes, 250 feet north and 200 feet east of the southwest corner of sec. 21, T. 18 N., R. 27 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to moderate fine granular; slightly hard, friable; neutral; clear smooth boundary.

Bt1—6 to 11 inches; dark brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, friable; shiny films on faces of peds; neutral; gradual smooth boundary.

Bt2—11 to 17 inches; olive brown (2.5Y 4/4) clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, friable; shiny films on faces of peds; mildly alkaline; clear smooth boundary.

Bk1—17 to 26 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, friable; common fine and medium accumulations of carbonate; strong effervescence; moderately alkaline; gradual smooth boundary.

Bk2—26 to 34 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak

coarse subangular blocky structure; slightly hard, friable; few fine and medium accumulations of carbonate; strong effervescence; moderately alkaline; clear wavy boundary.

Cr—34 to 60 inches; soft, weakly cemented sandstone bedrock.

Range in Characteristics

Thickness of the mollic epipedon: 7 to 16 inches

Depth to carbonates: 6 to 26 inches

Depth to a contrasting or impervious layer: 20 to 40 inches to soft sandstone

Regent Series

Depth to bedrock: Moderately deep

Drainage class: Well drained

Permeability: Slow

Landform: Dissected plains

Parent material: Clayey residuum

Slope: 0 to 9 percent

Typical Pedon

Regent silty clay loam, 2 to 6 percent slopes, 420 feet south and 200 feet east of the northwest corner of sec. 29, T. 22 N., R. 19 E.

A—0 to 6 inches; dark grayish brown (10YR 4/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; slightly hard, firm; neutral; clear smooth boundary.

Bt1—6 to 9 inches; dark grayish brown (2.5Y 4/2) silty clay, very dark grayish brown (2.5Y 3/2) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; hard, firm, sticky and plastic; shiny films on faces of peds; mildly alkaline; clear smooth boundary.

Bt2—9 to 14 inches; dark grayish brown (2.5Y 4/2) silty clay, very dark grayish brown (2.5Y 3/2) moist; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; hard, firm, sticky and plastic; shiny films on faces of peds; mildly alkaline; clear smooth boundary.

Bk—14 to 22 inches; olive (5Y 5/3) silty clay loam, olive (5Y 4/3) moist; weak coarse prismatic structure parting to weak coarse subangular blocky; slightly hard, firm, sticky and plastic; common fine and medium accumulations of carbonate; strong effervescence; moderately alkaline; clear smooth boundary.

C—22 to 33 inches; olive gray (5Y 5/2) silty clay loam, olive gray (5Y 4/2) moist; massive; slightly hard, firm, sticky and plastic; few fine accumulations of carbonate; few fine fragments of shale; strong

effervescence; strongly alkaline; clear wavy boundary.

Cr—33 to 60 inches; soft, bedded shale bedrock.

Range in Characteristics

Depth to carbonates: 10 to 20 inches

Depth to a contrasting or impervious layer: 20 to 40 inches to shale

Rhoades Series

Depth to bedrock: Deep

Drainage class: Well drained and moderately well drained

Permeability: Very slow

Landform: Dissected plains and other plains

Parent material: Clayey residuum

Slope: 0 to 9 percent

Typical Pedon

Rhoades loam, 0 to 6 percent slopes, 60 feet south and 45 feet east of the northwest corner of sec. 36, T. 22 N., R. 19 E.

E—0 to 3 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium and coarse subangular blocky structure parting to weak medium granular; slightly hard, friable; mildly alkaline; abrupt wavy boundary.

Bt—3 to 10 inches; grayish brown (2.5Y 5/2) clay loam, very dark grayish brown (2.5Y 3/2) moist; strong medium columnar structure parting to strong fine and medium angular blocky; extremely hard, firm, sticky and plastic; light gray (10YR 7/1) coatings on top of columns; shiny films on faces of peds; moderately alkaline; gradual wavy boundary.

Btyz—10 to 14 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium prismatic structure parting to weak fine subangular blocky; extremely hard, firm, sticky and plastic; shiny films on faces of peds; few fine accumulations of gypsum and other salts; slight effervescence; strongly alkaline; clear wavy boundary.

Bkyz—14 to 25 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure parting to strong medium and coarse angular blocky; very hard, firm, sticky and plastic; few fine accumulations of carbonate; few fine accumulations of gypsum and common fine accumulations of other salts; strong effervescence; moderately alkaline; clear wavy boundary.

Bz—25 to 49 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; few fine and medium distinct yellowish brown (10YR 5/6)

mottles; weak coarse subangular blocky structure; very hard, firm, sticky and plastic; few fine accumulations of carbonate; few fine accumulations of gypsum and common fine accumulations of other salts; strong effervescence; moderately alkaline; clear wavy boundary.

Cr—49 to 60 inches; bedded shale bedrock; shale can be dug with a spade, but plates are hard and brittle when dry.

Range in Characteristics

Depth to carbonates: 10 to 20 inches

Depth to a contrasting or impervious layer: 40 to more than 60 inches to shale

Other characteristics: An E horizon 2 to 5 inches thick; a thin A horizon in some pedons

Sansarc Series

Depth to bedrock: Shallow

Drainage class: Well drained

Permeability: Very slow

Landform: Dissected plains

Parent material: Clayey residuum

Slope: 6 to 40 percent

Typical Pedon

Sansarc clay, in an area of Sansarc-Opal clays, 15 to 40 percent slopes, 1,315 feet west and 110 feet south of the northeast corner of sec. 2, T. 18 N., R. 29 E.

A—0 to 4 inches; grayish brown (2.5Y 5/2) clay, very dark grayish brown (2.5Y 3/2) moist; weak fine subangular blocky structure parting to moderate fine and medium granular; hard, friable, sticky and plastic; slight effervescence; mildly alkaline; clear wavy boundary.

AC—4 to 10 inches; grayish brown (10YR 5/2) clay, dark grayish brown (10Y 4/2) moist; weak coarse subangular blocky structure parting to weak fine subangular blocky; hard, firm, sticky and plastic; about 25 percent fine fragments of shale; slight effervescence; mildly alkaline; gradual wavy boundary.

C—10 to 16 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, friable, sticky and plastic; few fine distinct stains of yellowish brown; few fine and medium accumulations of carbonate; about 60 percent fine fragments of shale; slight effervescence; mildly alkaline; gradual wavy boundary.

Cr—16 to 60 inches; bedded shale bedrock; shale can be dug with a spade, but plates are hard and brittle when dry.

Range in Characteristics

Depth to carbonates: 0 to 8 inches

Depth to a contrasting or impervious layer: 6 to 20 inches to shale

Other characteristics: Many seams of gypsum, lime, and other salts in the underlying bedded shale

Savage Series

Depth to bedrock: Deep

Drainage class: Well drained

Permeability: Slow

Landform: Fans and terraces

Parent material: Clayey alluvium

Slope: 0 to 6 percent

Typical Pedon

Savage silt loam, 3 to 6 percent slopes, 2,710 feet east and 1,800 feet north of the southwest corner of sec. 1, T. 19 N., R. 27 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; weak fine granular structure; slightly hard, friable; slightly acid; abrupt smooth boundary.

Bt1—7 to 11 inches; grayish brown (2.5Y 5/2) silty clay loam, very dark grayish brown (2.5Y 3/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, firm, slightly sticky and slightly plastic; shiny films on faces of peds; neutral; clear smooth boundary.

Bt2—11 to 21 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; moderate medium and coarse prismatic structure parting to moderate medium subangular blocky; extremely hard, very firm, sticky and plastic; shiny thin films on faces of peds; mildly alkaline; clear wavy boundary.

Btk—21 to 29 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure parting to weak coarse subangular blocky; extremely hard, very firm, sticky and plastic; shiny thin films on faces of peds; common medium accumulations of carbonate; slight effervescence; moderately alkaline; clear wavy boundary.

C—29 to 60 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, slightly sticky and slightly plastic; few fine accumulations of salts; slight effervescence; mildly alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 8 to 16 inches

Depth to carbonates: 10 to 22 inches

Depth to a contrasting or impervious layer: More than 60 inches

Shambo Series

Depth to bedrock: Deep

Drainage class: Well drained

Permeability: Moderate

Landform: Terraces

Parent material: Loamy alluvium

Slope: 0 to 15 percent

Typical Pedon

Shambo loam, 0 to 2 percent slopes, 2,500 feet east and 50 feet north of the southwest corner of sec. 35, T. 22 N., R. 18 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to weak fine granular; slightly hard, very friable; slightly acid; abrupt smooth boundary.

Bw1—7 to 11 inches; dark brown (10YR 4/3) loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable; neutral; clear wavy boundary.

Bw2—11 to 18 inches; olive brown (2.5Y 4/4) loam, dark grayish brown (2.5Y 4/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable; neutral; clear wavy boundary.

Bk1—18 to 26 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; weak medium prismatic structure parting to weak moderate subangular blocky; slightly hard, friable; common fine and medium accumulations of carbonate; strong effervescence; mildly alkaline; gradual wavy boundary.

Bk2—26 to 34 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; weak medium prismatic structure; slightly hard, friable; common fine and medium accumulations of carbonate; strong effervescence; mildly alkaline; gradual wavy boundary.

C1—34 to 43 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, friable; strong effervescence; mildly alkaline; clear wavy boundary.

C2—43 to 60 inches; grayish brown (2.5Y 5/2), stratified loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, friable; strong effervescence; strongly alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 7 to 16 inches

Depth to carbonates: 14 to 30 inches

Depth to a contrasting or impervious layer: More than 60 inches

Stady Series

Depth to bedrock: Deep

Drainage class: Well drained

Permeability: Moderate in the subsoil and very rapid in the underlying gravelly sand

Landform: Terraces

Parent material: Alluvium

Slope: 0 to 6 percent

Typical Pedon

Stady loam, 0 to 2 percent slopes, 1,000 feet north and 100 feet east of the southwest corner of sec. 27, T. 23 N., R. 19 E.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak coarse blocky structure parting to weak medium granular; slightly hard, friable; neutral; abrupt smooth boundary.

Bw1—5 to 10 inches; dark brown (10YR 4/3) loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, friable; few pebbles; neutral; gradual smooth boundary.

Bw2—10 to 15 inches; dark brown (10YR 4/3) loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, friable; few pebbles; neutral; clear smooth boundary.

Bk1—15 to 19 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure parting to moderate coarse subangular blocky; slightly hard, friable; common fine accumulations of carbonate; few pebbles; strong effervescence; moderately alkaline; clear wavy boundary.

Bk2—19 to 23 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; weak coarse subangular blocky structure; slightly hard, friable; common fine accumulations of carbonate; few pebbles; strong effervescence; moderately alkaline; clear wavy boundary.

C—23 to 60 inches; dark brown (10YR 4/3) gravelly sand, dark grayish brown (10YR 4/2) moist; single grain; loose; about 30 percent gravel; some pebbles having thin accumulations of carbonate on undersides; slight effervescence; moderately alkaline.



Figure 14.—Profile of Stady loam. The soil is dark to a depth of about 15 inches. Gravelly sand is at a depth of about 23 inches. Depth is marked in feet.

Range in Characteristics

Thickness of the mollic epipedon: 7 to 16 inches (fig. 14)

Depth to carbonates: 15 to 23 inches

Depth to a contrasting or impervious layer: 20 to 40 inches to sand and gravel

Sutley Series

Depth to bedrock: Deep

Drainage class: Well drained

Permeability: Moderate

Landform: Dissected plains and other plains

Parent material: Loess

Slope: 4 to 9 percent

Typical Pedon

Sutley silt loam, in an area of Bryant-Sutley silt loams, 6 to 9 percent slopes, 1,850 feet north and 185 feet east of the southwest corner of sec. 30, T. 22 N., R. 30 E.

Ap—0 to 6 inches; grayish brown (2.5Y 5/2) silt loam, very dark grayish brown (2.5Y 3/2) moist; weak fine granular structure; slightly hard, friable; slight effervescence; mildly alkaline; abrupt smooth boundary.

Bk—6 to 21 inches; light brownish gray (2.5Y 6/2) silt loam, grayish brown (2.5Y 5/2) moist; weak medium and coarse subangular blocky structure; slightly hard, friable; common fine accumulations of carbonate; strong effervescence; mildly alkaline; gradual wavy boundary.

C1—21 to 31 inches; light brownish gray (2.5Y 6/2) silt loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, friable; few fine accumulations of carbonate; strong effervescence; moderately alkaline; gradual smooth boundary.

C2—31 to 60 inches; light brownish gray (2.5Y 6/2) silt loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, friable; few stains (iron and manganese oxide); few fine accumulations of carbonate; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 0 to 10 inches

Depth to a contrasting or impervious layer: More than 60 inches

Tally Series

Depth to bedrock: Deep

Drainage class: Well drained

Permeability: Moderately rapid

Landform: Plains

Parent material: Alluvium and eolian material

Slope: 0 to 6 percent

Typical Pedon

Tally fine sandy loam, 0 to 6 percent slopes, 2,050 feet south and 120 feet west of northeast corner of sec. 17, T. 20 N., R. 18 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very

friable; neutral; abrupt clear boundary.

Bw1—7 to 15 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak coarse prismatic structure parting to weak medium subangular blocky; soft, very friable; neutral; clear smooth boundary.

Bw2—15 to 29 inches; grayish brown (2.5Y 5/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; weak coarse subangular blocky structure; soft, very friable; mildly alkaline; clear wavy boundary.

C—29 to 60 inches; multicolored fine sand; single grain; loose; strong effervescence; moderately alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 15 inches

Depth to carbonates: 15 to 30 inches

Depth to a contrasting or impervious layer: More than 60 inches

Other characteristics: Typically no Bk horizon; carbonates in the C horizon

Telfer Series

Depth to bedrock: Deep

Drainage class: Somewhat excessively drained

Permeability: Rapid

Landform: Dissected plains and other plains

Parent material: Eolian material

Slope: 0 to 25 percent

Typical Pedon

Telfer loamy sand, in an area of Flasher-Telfer complex, 15 to 40 percent slopes, 600 feet south and 1,600 feet east of the northwest corner of sec. 29, T. 19 N., R. 26 E.

A1—0 to 4 inches; dark grayish brown (10YR 4/2) loamy sand, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable; neutral; clear wavy boundary.

A2—4 to 11 inches; dark brown (10YR 4/3) loamy sand, very dark grayish brown (10YR 3/2) moist; weak coarse prismatic structure parting to weak fine granular; slightly hard, very friable; neutral; clear wavy boundary.

C1—11 to 30 inches; yellowish brown (10YR 5/4) loamy sand, dark yellowish brown (10YR 4/4) moist; weak coarse prismatic structure parting to weak fine granular; slightly hard, loose; neutral; clear wavy boundary.

C2—30 to 60 inches; light olive brown (2.5Y 5/4) loamy sand, olive brown (2.5Y 4/4) moist; single grain; neutral.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 20 inches

Depth to carbonates: 40 to more than 60 inches

Depth to a contrasting or impervious layer: More than 60 inches

Trembles Series

Depth to bedrock: Deep

Drainage class: Well drained

Permeability: Moderately rapid

Landform: Flood plains and terraces

Parent material: Alluvium

Slope: 0 to 4 percent

Typical Pedon

Trembles fine sandy loam, 300 feet east and 1,280 feet north of the southwest corner of sec. 9, T. 20 N., R. 18 E.

A—0 to 9 inches; grayish brown (2.5Y 5/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; weak fine granular structure; soft, very friable; moderately alkaline; gradual wavy boundary.

C1—9 to 39 inches; grayish brown (2.5Y 5/2) fine sandy loam that is stratified with thin lenses of silt and fine sand, dark grayish brown (2.5Y 4/2) moist; massive; soft, very friable; slight effervescence; moderately alkaline; gradual wavy boundary.

C2—39 to 60 inches; grayish brown (2.5Y 5/2) loamy fine sand that is stratified with thin lenses of fine sand and silt, dark grayish brown (2.5Y 4/2) moist; massive; slight effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 0 to 9 inches

Depth to a contrasting or impervious layer: More than 60 inches

Vebar Series

Depth to bedrock: Moderately deep

Drainage class: Well drained

Permeability: Moderately rapid

Landform: Dissected plains

Parent material: Loamy residuum

Slope: 0 to 15 percent

Typical Pedon

Vebar fine sandy loam, 2 to 6 percent slopes, 1,100 feet north and 1,000 feet east of the southwest corner of sec. 31, T. 20 N., R. 26 E.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) fine sandy loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure parting to

weak fine granular; slightly hard, very friable; slightly acid; abrupt smooth boundary.

Bw1—7 to 13 inches; dark brown (10YR 4/3) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium and coarse prismatic structure parting to weak medium and coarse subangular blocky; slightly hard, very friable; neutral; gradual smooth boundary.

Bw2—13 to 23 inches; dark yellowish brown (10YR 4/4) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak coarse prismatic structure parting to weak coarse subangular blocky; slightly hard, very friable; neutral; clear wavy boundary.

C—23 to 30 inches; yellowish brown (10YR 5/4) fine sandy loam, dark grayish brown (10YR 4/2) moist; massive; soft, very friable; few small fragments of sandstone; neutral; clear wavy boundary.

Cr—30 to 60 inches; soft, weakly cemented sandstone bedrock.

Range in Characteristics

Thickness of the mollic epipedon: 7 to 16 inches

Depth to carbonates: 18 to 40 inches

Depth to a contrasting or impervious layer: 20 to 40 inches to soft sandstone

Other characteristics: Free carbonates in the lower part of the subsoil or in the upper part of the sandstone in some pedons

Wabek Series

Depth to bedrock: Deep

Drainage class: Excessively drained

Permeability: Very rapid

Landform: Terraces

Parent material: Alluvium

Slope: 2 to 35 percent

Typical Pedon

Wabek gravelly sandy loam, 2 to 35 percent slopes, 1,100 feet west and 2,000 feet north of southeast corner of sec. 20, T. 21 N., R. 24 E.

A—0 to 8 inches; dark grayish brown (10YR 4/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; slightly hard, very friable; neutral; clear wavy boundary.

2C1—8 to 12 inches; multicolored gravelly coarse sand, single grain; loose; few roots; about 30 percent gravel; slight effervescence; neutral; gradual wavy boundary.

C2—12 to 60 inches; multicolored very gravelly sand; single grain; loose; accumulations of carbonate on undersides of some gravels; about 45 percent gravel; strong effervescence; moderately alkaline.

Range in Characteristics

Depth to carbonates: 4 to 9 inches

Depth to a contrasting or impervious layer: 7 to 14 inches to sand and gravel

Other characteristics: No free carbonates in some pedons

Wayden Series

Depth to bedrock: Shallow

Drainage class: Well drained

Permeability: Slow

Landform: Dissected plains

Parent material: Clayey residuum

Slope: 6 to 40 percent

Typical Pedon

Wayden silty clay loam, in an area of Regent-Wayden silty clay loams, 6 to 15 percent slopes, 1,200 feet east and 70 feet north of the southwest corner of sec. 17, T. 21 N., R. 19 E.

A—0 to 5 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderate very fine and fine subangular blocky structure parting to moderate fine granular; hard, firm, slightly sticky and slightly plastic; moderately alkaline; clear wavy boundary.

C1—5 to 10 inches; olive (5Y 5/3) silty clay loam, olive (5Y 4/3) moist; moderate coarse subangular blocky structure parting to moderate fine and medium subangular blocky; hard, firm, slightly sticky and slightly plastic; few fine accumulations of carbonate; slight effervescence; strongly alkaline; gradual wavy boundary.

C2—10 to 18 inches; olive (5Y 5/3) silty clay loam, olive (5Y 4/3) moist; weak coarse subangular blocky structure parting to moderate fine subangular blocky; hard, firm, slightly sticky and slightly plastic; common fine and medium accumulations of carbonate; strong effervescence; strongly alkaline; clear wavy boundary.

Cr—18 to 60 inches; bedded shale bedrock.

Range in Characteristics

Depth to carbonates: 0 to 6 inches

Depth to a contrasting or impervious layer: 10 to 20 inches to shale

Wendte Series

Depth to bedrock: Deep

Drainage class: Moderately well drained

Permeability: Slow

Landform: Flood plains

Parent material: Clayey alluvium

Slope: 0 to 2 percent

Typical Pedon

Wendte silty clay, channeled, 1,300 feet west and 2,300 feet south of the northeast corner of sec. 23, T. 20 N., R. 28 E.

A—0 to 5 inches; dark grayish brown (10YR 4/2) silty clay, very dark grayish brown (10YR 3/2) moist; weak very thin and thin platy structure parting to fine and medium granular; hard, firm, sticky and plastic; neutral; clear smooth boundary.

C1—5 to 17 inches; gray (10YR 5/1) silty clay, very dark gray (10YR 3/1) moist; weak coarse subangular blocky structure; hard, firm, sticky and plastic; neutral; clear smooth boundary.

C2—17 to 31 inches; gray ((10YR 5/1) silty clay, very dark gray (10YR 3/1) moist; massive; hard, firm, sticky and plastic; neutral; clear smooth boundary.

C3—31 to 60 inches; grayish brown (2.5Y 5/2), stratified silty clay and silty clay loam, very dark grayish brown (2.5Y 3/2) moist; massive; hard, firm, slightly sticky and slightly plastic; neutral.

Range in Characteristics

Depth to carbonates: More than 60 inches

Depth to a contrasting or impervious layer: More than 60 inches

Other characteristics: A buried A horizon at a depth of more than 20 inches in some pedons

The Wendte soils in this county are leached to depths greater than those defined as the range for the series. This difference, however, does not significantly affect the use and behavior of the soils.

Zeona Series

Depth to bedrock: Deep

Drainage class: Excessively drained

Permeability: Rapid

Landform: Dissected plains and other plains

Parent material: Eolian material

Slope: 0 to 9 percent

Typical Pedon

Zeona loamy fine sand, 0 to 6 percent slopes, 2,060 feet west and 340 feet south of the northeast corner of sec. 29, T. 20 N., R. 18 E.

A—0 to 4 inches; dark grayish brown (2.5Y 4/2) loamy fine sand, very dark grayish brown (2.5Y 3/2) moist; single grain; soft, very friable; neutral; smooth wavy boundary.

C1—4 to 24 inches; light olive brown (2.5Y 5/4) loamy

fine sand, dark grayish brown (2.5Y 4/2) moist;
single grain; soft, very friable; neutral; gradual wavy
boundary.

C2—24 to 44 inches; grayish brown (2.5Y 5/2) loamy
fine sand, dark grayish brown (2.5Y 4/2) moist;
single grain; soft, very friable; neutral; gradual wavy
boundary.

C3—44 to 60 inches; grayish brown (2.5Y 5/2) loamy

fine sand, dark grayish brown (2.5Y 4/2) moist;
single grain; soft, very friable; slight effervescence;
mildly alkaline.

Range in Characteristics

Depth to carbonates: More than 36 inches

Depth to a contrasting or impervious layer: More than 60
inches

Formation of the Soils

Soil forms when chemical and physical processes act on geologically deposited or accumulated material. The characteristics of the soil at any given point are determined by the physical and mineralogical composition of the parent material, the climate under which the soil material has accumulated and existed since accumulation, the plant and animal life on and in the soil, the relief, and the length of time that the forces of soil formation have acted on the soil material.

Climate and plant and animal life are active factors of soil formation. They act on the parent material and slowly change it to a natural body that has genetically related horizons. The effects of climate and plant and animal life are conditioned by relief. The parent material affects the kind of soil profile that forms and, in extreme cases, determines it almost entirely. Finally, time is needed for the transformation of the parent material into a soil having genetically related horizons. A long time usually is required for development of distinct horizons.

The five factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effect of any one factor unless conditions are specified for the other four. The following paragraphs relate the factors of soil formation to the soils in Corson County.

Climate

Climate directly influences the rate of chemical and physical weathering. Corson County has a continental climate marked by cold winters and hot summers. This climate favors the growth of grasses and the resulting accumulation of organic matter in the upper part of the soil. It also favors a moderately slow rate of weathering or soil formation. Because the climate is somewhat wetter in the eastern part of the county than in the western part, it becomes a factor in differentiating some of the soils within the county. Detailed information about the climate is given under the heading "General Nature of the County."

Plant and Animal Life

Living organisms have an important effect on soil formation. They include plants, animals, insects,

earthworms, bacteria, and fungi. They cause gains in organic matter, gains or losses in plant nutrients, and changes in soil structure and porosity. In Corson County the prairie grasses have had more influence than other living organisms on soil formation. Because of these grasses, the surface layer of many soils has a moderate content of organic matter. The gently sloping Reeder soils contain more organic matter than the more sloping Cabba soils because they have a more extensive grass cover.

Earthworms, insects, and burrowing animals help to keep the soil open and porous. Bacteria and fungi decompose plant residue, thus releasing plant nutrients.

Parent Material

Parent material is the unconsolidated organic and mineral material in which a soil forms. It determines many of the chemical and physical characteristics of the soil, such as color, texture, reaction, and consistence. The rate of soil formation is more rapid in the more friable, loamy and silty parent material than in other kinds of parent material. Also, more changes take place and the horizons are more distinct in this material.

Most of the soils in Corson County formed in material weathered from the underlying bedrock. The remainder formed in old alluvial deposits on high terraces or in recent alluvial deposits on flood plains, on foot slopes, and in basins in the uplands.

Five major geological formations are in Corson County. The Cannonball and Ludlow Formations are in the northwestern part of the county. The Hell Creek Formation is in the north-central and southwestern parts. The Fox Hills Formation is in the northeastern and south-central parts. The Pierre Formation is in the eastern part.

The bedrock in the eastern part of the county dominantly consists of clayey shale of the Pierre Formation. This formation underlies the entire county but is exposed only in the eastern part. The bedrock is gray to light olive gray and has beds of bentonite and seams of limestone, iron, and manganese concretions. Bullcreek, Dupree, Opal, Promise, Sansarc, and



Figure 15.—Exposed beds of ancient sea sediments of the Hell Creek Formation in an area of Badland. Havrelon-Rhoades loams, 0 to 4 percent slopes, are in the lower vegetated areas.

Wendte soils formed in material weathered from the Pierre Formation.

The bedrock in the south-central and northeastern parts of the county consists of interbedded shale and sandstone of the Fox Hills Formation. The Fox Hills Formation overlies the Pierre Formation and underlies the Hell Creek Formation. Cohagen and Vebar soils formed in the more sandy material of this formation, Cabba and Reeder soils formed in material weathered from the loamy and silty beds, and Regent soils formed in material weathered from the clayey beds.

The bedrock in the north-central and southwestern parts of the county dominantly consists of strongly

alkaline siltstone and fine grained sandstone of the Hell Creek Formation (fig. 15). This formation overlies the Fox Hills Formation. Many of the soils that formed in material weathered from the Hell Creek Formation have a sodium-affected subsoil and have a scabby appearance because of the extreme microrelief. Bullock, Daglum, Evridge, Parchin, and Rhoades soils are sodium-affected soils that formed in material weathered from this formation.

The bedrock in the northwestern part of the county dominantly consists of shale, sandstone, and clay of the Ludlow and Cannonball Formations of the Fort Union Group. These formations overlie the Hell Creek

Formation. Vebar and Cohagen soils formed in the more sandy material of the Ludlow Formation. Grail, Reeder, Regent, and Savage soils formed in material weathered from the clayey beds of the Cannonball Formation.

The alluvium in Corson County is recently deposited sandy to clayey material on flood plains and older deposits of loamy and silty material on high terraces, mainly along the Grand River. Farnuf, Shambo, and Stady soils formed in old alluvium on high terraces. Banks, Havrelon, and Trembles soils formed in recent alluvium on the flood plains along the Grand River. Heil soils formed in alluvium in basins in the uplands. Grail soils formed on foot slopes in local alluvium that was washed from the adjacent uplands.

Relief

Relief affects soil formation through its effect on drainage, runoff, erosion, plant cover, and soil temperature. On the more sloping soils, such as Cabba soils, much of the rainfall is lost through runoff. As a result of the excessive runoff, a limited amount of moisture penetrates the surface and much of the soil material is lost through erosion. These soils have a thin surface layer and a low content of organic matter. On the less sloping soils, such as Reeder and Regent soils, the runoff rate is slower and more moisture penetrates the surface. These soils are calcareous at a greater

depth than the Cabba soils. Also, the horizons that have accumulated organic matter are thicker in these soils.

Heil soils are in basins where water ponds. They have the characteristic colors of poorly drained soils. Arnegard soils are on foot slopes and receive extra moisture in the form of runoff from adjacent soils. The horizons that have accumulated organic matter are thicker in Arnegard soils than in the slightly higher and adjacent Reeder and Regent soils. In low areas where drainage is impeded, a fluctuating water table favors the concentration of salts in soils such as Glenross.

Time

The length of time that climate, plant and animal life, and relief have affected the parent material helps to determine the kind of soil that forms. Generally, the degree of profile development reflects the age of a soil. The oldest soils are on the parts of the landscape that have been stable for the longest time. The oldest soils in Corson County are Farnuf and Savage soils, which have developed distinct horizons. The youngest soils either are those in which natural erosion removes nearly as much soil material as is formed through the weathering of parent material or are alluvial soils, which receive new material each time the area is flooded. Cabba and Sansarc soils are examples of young soils that are subject to natural erosion. Banks and Trembles soils are examples of young alluvial soils.

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Glossary

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High.....	9 to 12
Very high	more than 12

Back slope. The steepest inclined surface and principal element of many hill slopes. Back slopes are commonly steep and linear and descend to a foot slope. Back slopes are erosional forms produced mainly by mass wasting and running water.

Badland. Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

Basin. A depressional area with no surface outlet. Examples include closed depressions in a lake basin.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Blowout. A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of

concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour farming. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Depth, soil. The thickness of weathered soil material over bedrock. The depth classes recognized in this survey are:

Deep..... more than 40 inches
Moderately deep..... 20 to 40 inches

Shallow..... 10 to 20 inches
Very shallow..... less than 10 inches

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free

water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount

of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of

transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, invader plants follow disturbance of the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Landform. Any physical, recognizable form or feature of the earth's surface. Landforms have a characteristic shape and are produced by natural causes.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by the wind.

Low strength. The soil is not strong enough to support loads.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include part of the subsoil.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon. A specific kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile.

Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch

Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor on the basis of how much the present plant community has departed from the potential.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The

degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called groundwater runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Shoulder. The uppermost inclined surface at the top of a hill slope. Shoulders are transition zones from back slopes to a summit in upland areas. They dominantly are convex in profile and erosional in origin.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slickspot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. The slope classes recognized in this survey area are as follows:

Level	0 to 1 percent
Nearly level	0 to 2 percent
Very gently sloping or gently undulating	1 to 3 percent
Gently sloping or undulating	2 or 3 to 6 percent
Moderately sloping or gently rolling	6 to 9 percent
Strongly sloping	9 to 15 percent
Moderately steep	15 to 25 percent
Steep	25 to 40 percent
Very steep	40 percent or more

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand.....	2.0 to 1.0
Coarse sand.....	1.0 to 0.5
Medium sand.....	0.5 to 0.25
Fine sand.....	0.25 to 0.10
Very fine sand.....	0.10 to 0.05
Silt.....	0.05 to 0.002
Clay.....	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on

the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summit. The top or highest level of an upland feature. A high interfluvial area that has gentler slopes and that is flanked by steeper hill slopes.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand*, *loamy sand*, *sandy loam*, *loam*, *silt loam*, *silt*, *sandy clay loam*, *clay loam*, *silty clay loam*, *sandy clay*, *silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be

further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Too arid (in tables). The soil is dry most of the time, and vegetation is difficult to establish.

Topsoll. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-81 at McIntosh, South Dakota)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have--		Average number of growing degree days*	Average	2 years in 10 will have--		Average number of days with 0.10 inch or more	Average snowfall
				Maximum temperature higher than--	Minimum temperature lower than--			Less than--	More than--		
° F	° F	° F	° F	° F	Units	In	In	In		In	
January-----	22.6	1.6	12.1	55	-30	19	0.34	0.11	0.52	1	3.4
February----	29.3	8.4	18.9	60	-23	20	.39	.12	.60	1	3.8
March-----	38.8	17.3	28.1	74	-13	61	.71	.21	1.12	2	6.0
April-----	55.8	31.5	43.7	85	10	192	1.60	.45	2.53	4	2.8
May-----	68.4	43.0	55.7	91	23	487	2.54	1.14	3.72	6	.6
June-----	77.8	53.1	65.5	98	38	765	3.37	2.03	4.56	7	.0
July-----	86.1	58.7	72.4	105	43	1,004	2.25	1.20	3.17	5	.0
August-----	84.9	56.8	70.9	103	42	958	1.89	.77	2.83	5	.0
September---	72.9	45.6	59.3	99	25	579	1.44	.31	2.33	3	.0
October-----	61.0	35.1	48.1	87	14	282	.92	.15	1.51	2	.7
November----	41.7	20.3	31.0	71	-8	48	.43	.04	.72	2	4.1
December----	27.9	8.4	18.2	58	-23	19	.41	.10	.65	2	4.3
Yearly:											
Average---	55.6	31.7	43.7	---	---	---	---	---	---	---	---
Extreme---	---	---	---	105	-31	---	---	---	---	---	---
Total-----	---	---	---	---	---	4,434	16.29	13.10	19.10	40	25.7

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL
(Recorded in the period 1951-81 at McIntosh, South Dakota)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	May 7	May 15	May 24
2 years in 10 later than--	May 2	May 10	May 18
5 years in 10 later than--	Apr. 22	Apr. 30	May 8
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 3	Sept. 25	Sept. 12
2 years in 10 earlier than--	Oct. 8	Sept. 29	Sept. 17
5 years in 10 earlier than--	Oct. 18	Oct. 7	Sept. 27

TABLE 3.--GROWING SEASON
(Recorded in the period 1951-81 at McIntosh,
South Dakota)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	<u>Days</u>	<u>Days</u>	<u>Days</u>
9 years in 10	157	139	118
8 years in 10	164	146	126
5 years in 10	178	159	141
2 years in 10	192	172	155
1 year in 10	199	178	163

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
An	Arnegard loam-----	16,970	1.0
Bb	Badland-----	2,380	0.1
Bd	Banks fine sand-----	3,295	0.2
BeA	Belfield-Daglum complex, 0 to 3 percent slopes-----	9,230	0.6
BfA	Bryant silt loam, 0 to 2 percent slopes-----	1,725	0.1
BfB	Bryant silt loam, 2 to 6 percent slopes-----	13,830	0.9
BgB	Bryant-Sutley silt loams, 2 to 6 percent slopes-----	1,885	0.1
BgC	Bryant-Sutley silt loams, 6 to 9 percent slopes-----	2,320	0.1
BlA	Bullcreek clay, 0 to 4 percent slopes-----	5,100	0.3
BmA	Bullcreek-Slickspots complex, 0 to 4 percent slopes-----	8,785	0.5
BnA	Bullock fine sandy loam, 0 to 6 percent slopes-----	8,840	0.5
BrB	Bullock-Parchin fine sandy loams, 0 to 9 percent slopes-----	54,855	3.4
BsB	Bullock-Parchin-Slickspots complex, 0 to 9 percent slopes-----	20,265	1.2
BuB	Bullock-Slickspots complex, 0 to 6 percent slopes-----	8,355	0.5
BvE	Bullock-Slickspots-Rock outcrop complex, 0 to 40 percent slopes-----	23,515	1.4
BzB	Bullock-Telfer-Parchin complex, 0 to 9 percent slopes-----	6,545	0.4
CaF	Cabba-Amor loams, 15 to 60 percent slopes-----	10,840	0.7
CbD	Cabba-Reeder loams, 6 to 25 percent slopes-----	83,980	5.2
CeE	Cabba-Shambo loams, 6 to 40 percent slopes-----	6,985	0.4
CgF	Cohagen-Cabba-Rock outcrop complex, 6 to 70 percent slopes-----	9,420	0.6
CvD	Cohagen-Vebar fine sandy loams, 6 to 25 percent slopes-----	61,270	3.8
DaA	Daglum loam, 0 to 3 percent slopes-----	37,875	2.3
DuD	Dupree-Rock outcrop complex, 6 to 30 percent slopes-----	26,890	1.7
EkA	Ekalaka very fine sandy loam, 0 to 6 percent slopes-----	2,670	0.2
EpB	Ekalaka-Parshall complex, 0 to 6 percent slopes-----	2,970	0.2
EvB	Evridge fine sandy loam, 0 to 6 percent slopes-----	3,790	0.2
EWB	Evridge-Bullock fine sandy loams, 0 to 6 percent slopes-----	9,840	0.6
ExB	Evridge-Parchin fine sandy loams, 0 to 6 percent slopes-----	21,355	1.3
FaA	Farnuf loam, 0 to 2 percent slopes-----	11,045	0.7
FaB	Farnuf loam, 2 to 6 percent slopes-----	13,945	0.9
FrF	Flasher-Rock outcrop complex, 30 to 60 percent slopes-----	1,895	0.1
FtF	Flasher-Telfer complex, 15 to 40 percent slopes-----	50,935	3.2
Ge	Glenross fine sandy loam-----	4,935	0.3
Gk	Glenross-Ekalaka fine sandy loams-----	1,335	0.1
Gr	Grail silty clay loam-----	14,240	0.9
Gs	Grassna silt loam-----	1,515	0.1
Hd	Harriet loam-----	3,045	0.2
Hf	Havrelon loam-----	4,560	0.3
Hg	Havrelon loam, channeled-----	7,290	0.4
Hn	Havrelon loam, terrace-----	5,665	0.3
HrA	Havrelon-Rhoades loams, 0 to 4 percent slopes-----	4,775	0.3
Hs	Heil silt loam-----	6,190	0.4
HuB	Hurley silt loam, 0 to 9 percent slopes-----	5,780	0.4
HwA	Hurley-Slickspots complex, 0 to 6 percent slopes-----	8,765	0.5
Ka	Korchea loam-----	3,825	0.2
Kc	Korchea loam, channeled-----	16,040	1.0
La	Lallie silty clay loam-----	3,690	0.2
LeA	Lehr loam, 0 to 2 percent slopes-----	1,270	0.1
LeB	Lehr loam, 2 to 6 percent slopes-----	1,945	0.1
Mc	McKenzie clay-----	1,500	0.1
OaB	Opal clay, 2 to 6 percent slopes-----	4,860	0.3
OaC	Opal clay, 6 to 9 percent slopes-----	3,780	0.2
OdC	Opal-Dupree clays, 2 to 9 percent slopes-----	19,795	1.2
OhB	Opal-Hurley complex, 0 to 9 percent slopes-----	6,010	0.4
OsC	Opal-Sansarc clays, 6 to 15 percent slopes-----	10,925	0.7
PaB	Parchin fine sandy loam, 0 to 9 percent slopes-----	6,100	0.4
PdD	Parchin-Bullock-Cabba complex, 6 to 30 percent slopes-----	2,400	0.1
PeA	Parshall fine sandy loam, 0 to 6 percent slopes-----	4,990	0.3
Pg	Pits, gravel-----	535	*
PrA	Promise clay, 0 to 2 percent slopes-----	2,665	0.2
PrB	Promise clay, 2 to 6 percent slopes-----	3,385	0.2

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
RaA	Reeder loam, 0 to 2 percent slopes-----	5,215	0.3
RaB	Reeder loam, 2 to 6 percent slopes-----	83,265	5.2
RaC	Reeder loam, 6 to 9 percent slopes-----	2,290	0.1
RcB	Reeder-Cabba loams, 3 to 6 percent slopes-----	69,785	4.3
RcC	Reeder-Cabba loams, 6 to 9 percent slopes-----	71,745	4.4
RhB	Reeder-Rhoades loams, 2 to 9 percent slopes-----	25,840	1.6
RnA	Regent silty clay loam, 0 to 2 percent slopes-----	2,790	0.2
RnB	Regent silty clay loam, 2 to 6 percent slopes-----	48,250	3.0
RpC	Regent-Wayden silty clay loams, 6 to 15 percent slopes-----	20,345	1.3
RrA	Rhoades loam, 0 to 6 percent slopes-----	15,810	1.0
RsB	Rhoades-Daglum loams, 0 to 9 percent slopes-----	123,045	7.5
RtB	Rhoades-Daglum-Slickspots complex, 0 to 9 percent slopes-----	18,050	1.1
RuB	Rhoades-Slickspots complex, 0 to 6 percent slopes-----	11,650	0.7
RvE	Rhoades-Slickspots-Rock outcrop complex, 0 to 40 percent slopes-----	6,755	0.4
RzF	Rock outcrop-Cabba complex, 6 to 40 percent slopes-----	11,470	0.7
SbE	Sansarc-Opal clays, 15 to 40 percent slopes-----	24,550	1.5
SdD	Sansarc-Opal-Dupree clays, 9 to 25 percent slopes-----	31,925	2.0
SeE	Sansarc-Wabek complex, 15 to 40 percent slopes-----	4,590	0.3
SgA	Savage silt loam, 0 to 3 percent slopes-----	6,085	0.4
SgB	Savage silt loam, 3 to 6 percent slopes-----	7,340	0.5
ShA	Shambo loam, 0 to 2 percent slopes-----	18,975	1.2
ShB	Shambo loam, 2 to 6 percent slopes-----	31,300	1.9
ShC	Shambo loam, 6 to 9 percent slopes-----	1,625	0.1
StA	Stady loam, 0 to 2 percent slopes-----	11,835	0.7
StB	Stady loam, 2 to 6 percent slopes-----	2,905	0.2
TaA	Tally fine sandy loam, 0 to 6 percent slopes-----	10,575	0.7
TdA	Telfer loamy sand, 0 to 6 percent slopes-----	6,420	0.4
TeB	Telfer-Ekalaka complex, 0 to 6 percent slopes-----	1,925	0.1
Th	Trembles fine sandy loam-----	12,195	0.8
Tm	Trembles fine sandy loam, channeled-----	12,245	0.8
Tt	Trembles fine sandy loam, terrace-----	13,570	0.8
VeA	Vebar fine sandy loam, 0 to 2 percent slopes-----	11,115	0.7
VeB	Vebar fine sandy loam, 2 to 6 percent slopes-----	53,695	3.3
VhB	Vebar-Cohagen fine sandy loams, 2 to 9 percent slopes-----	49,795	3.1
WaD	Wabek gravelly sandy loam, 2 to 35 percent slopes-----	7,395	0.5
WcE	Wayden-Cabba complex, 9 to 40 percent slopes-----	24,415	1.5
WdE	Wayden and Cabba soils, 6 to 40 percent slopes, extremely stony-----	2,195	0.1
Wt	Wendte silty clay, channeled-----	2,375	0.2
ZeB	Zeona loamy fine sand, 0 to 6 percent slopes-----	630	*
ZsD	Zeona-Slickspots-Rock outcrop complex, 0 to 30 percent slopes-----	1,100	0.1
	Water-----	48,304	3.0
	Total-----	1,620,794	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
An	Arnegard loam
BfA	Bryant silt loam, 0 to 2 percent slopes (where irrigated)
BfB	Bryant silt loam, 2 to 6 percent slopes (where irrigated)
BgB	Bryant-Sutley silt loams, 2 to 6 percent slopes (where irrigated)
FaA	Farnuf loam, 0 to 2 percent slopes (where irrigated)
FaB	Farnuf loam, 2 to 6 percent slopes (where irrigated)
Gr	Grail silty clay loam
Gs	Grassna silt loam
Hf	Havrelon loam (where irrigated)
Hn	Havrelon loam, terrace (where irrigated)
Ka	Korchea loam (where irrigated)
PeA	Parshall fine sandy loam, 0 to 6 percent slopes (where irrigated)
SgA	Savage silt loam, 0 to 3 percent slopes (where irrigated)
SgB	Savage silt loam, 3 to 6 percent slopes (where irrigated)
ShA	Shambo loam, 0 to 2 percent slopes (where irrigated)
ShB	Shambo loam, 2 to 6 percent slopes (where irrigated)
StA	Stady loam, 0 to 2 percent slopes (where irrigated)
StB	Stady loam, 2 to 6 percent slopes (where irrigated)
TaA	Tally fine sandy loam, 0 to 6 percent slopes (where irrigated)
Th	Trembles fine sandy loam (where irrigated)
Tt	Trembles fine sandy loam, terrace (where irrigated)

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Spring wheat	Oats	Alfalfa hay	Cool-season grass
	<u>Bu</u>	<u>Bu</u>	<u>Tons</u>	<u>AUM*</u>
An----- Arnegard	32	65	2.5	4.2
Eb**. Badland				
Bd. Banks				
BeA----- Belfield-Daglum	18	38	---	---
BfA----- Bryant	29	61	2.0	3.5
BfB----- Bryant	27	55	1.8	3.0
BgB----- Bryant-Sutley	24	48	1.5	2.2
BgC----- Bryant-Sutley	18	40	1.2	1.7
BlA. Bullcreek				
BmA**. Bullcreek-Slickspots				
BnA. Bullock				
BrB. Bullock-Parchin				
BsB**. Bullock-Parchin- Slickspots				
BuB**. Bullock-Slickspots				
BvE**. Bullock-Slickspots-Rock outcrop				
BzB. Bullock-Telfer-Parchin				
CaF. Cabba-Amor				
CbD. Cabba-Reeder				

See footnotes at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Spring wheat	Oats	Alfalfa hay	Cool-season grass
	<u>Bu</u>	<u>Bu</u>	<u>Tons</u>	<u>AUM*</u>
CeE. Cabba-Shambo				
CgF**. Cohagen-Cabba-Rock outcrop				
CvD. Cohagen-Vebar				
DaA----- Daglum	9	18	---	---
DuD**. Dupree-Rock outcrop				
EkA----- Ekalaka	17	34	1.1	1.6
EpB----- Ekalaka-Parshall	18	36	1.1	1.6
EvB----- Evridge	12	21	1.3	2.2
EwB. Evridge-Bullock				
ExB----- Evridge-Parchin	13	28	0.8	1.0
FaA----- Farnuf	28	55	1.8	3.0
FaB----- Farnuf	26	52	1.6	2.6
FrF**. Flasher-Rock outcrop				
FtF. Flasher-Telfer				
Ge. Glenross				
Gk. Glenross-Ekalaka				
Gr----- Grail	30	65	2.5	4.2
Gs----- Grassna	32	67	2.8	4.3
Hd. Harriet				
Hf----- Havrelon	27	54	1.8	3.0

See footnotes at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Spring wheat	Oats	Alfalfa hay	Cool-season grass
	<u>Bu</u>	<u>Bu</u>	<u>Tons</u>	<u>AUM*</u>
Hg. Havrelon				
Hn----- Havrelon	27	54	1.8	3.0
HrA. Havrelon-Rhoades				
Hs. Heil				
HuB. Hurley				
HwA**. Hurley-Slickspots				
Ka----- Korchea	27	54	1.8	3.0
Kc. Korchea				
La. Lallie				
LeA----- Lehr	16	34	1.1	1.6
LeB----- Lehr	15	30	1.0	1.2
Mc. McKenzie				
OaB----- Opal	21	42	1.3	1.8
OaC----- Opal	17	33	1.3	2.2
OdC----- Opal-Dupree	16	30	1.0	1.6
OhB. Opal-Hurley				
OsC. Opal-Sansarc				
PaB----- Parchin	17	34	1.1	1.6
PdD. Parchin-Bullock-Cabba				
PeA----- Parshall	20	42	1.3	1.8

See footnotes at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Spring wheat	Oats	Alfalfa hay	Cool-season grass
	<u>Bu</u>	<u>Bu</u>	<u>Tons</u>	<u>AUM*</u>
Pg**. Pits				
PrA----- Promise	24	48	1.5	2.2
PrB----- Promise	22	47	1.5	2.1
RaA----- Reeder	27	52	1.7	2.8
RaB----- Reeder	25	50	1.6	2.6
RaC----- Reeder	22	44	1.3	2.0
RcB----- Reeder-Cabba	22	46	1.3	2.0
RcC----- Reeder-Cabba	19	40	1.2	1.7
RhB----- Reeder-Rhoades	17	36	1.1	1.6
RnA----- Regent	27	52	1.6	2.8
RnB----- Regent	24	49	1.6	2.5
RpC. Regent-Wayden				
RrA. Rhoades				
RsB. Rhoades-Daglum				
RtB**. Rhoades-Daglum-Slickspots				
RuB**. Rhoades-Slickspots				
RvE**. Rhoades-Slickspots-Rock outcrop				
RzF**. Rock outcrop-Cabba				
SbE. Sansarc-Opal				
SdD. Sansarc-Opal-Dupree				

See footnotes at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Spring wheat	Oats	Alfalfa hay	Cool-season grass
	<u>Bu</u>	<u>Bu</u>	<u>Tons</u>	<u>AUM*</u>
SeE. Sansarc-Wabek				
SgA----- Savage	27	52	1.6	2.8
SgB----- Savage	25	50	1.6	2.5
ShA----- Shambo	27	52	1.7	2.8
ShB----- Shambo	25	50	1.6	2.5
ShC----- Shambo	22	44	1.3	2.0
StA----- Stady	21	42	1.3	1.8
StB----- Stady	18	38	1.2	1.7
TaA----- Tally	24	48	1.5	2.2
TdA----- Telfer	13	28	0.8	1.0
TeB----- Telfer-Ekalaka	13	30	0.8	1.0
Th, Tm----- Trembles	---	---	---	1.2
Tt----- Trembles	18	36	1.1	1.6
VeA----- Vebar	20	40	1.3	1.7
VeB----- Vebar	18	40	1.2	1.7
VhB----- Vebar-Cohagen	17	34	1.1	1.6
WaD. Wabek				
WcE, WdE. Wayden-Cabba				
Wt. Wendte				
ZeB. Zeona				

See footnotes at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Spring wheat	Oats	Alfalfa hay	Cool-season grass
	<u>Bu</u>	<u>Bu</u>	<u>Tons</u>	<u>AUM*</u>
ZsD**. Zeona-Slickspots-Rock outcrop				

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--RANGELAND CHARACTERISTIC VEGETATION AND PRODUCTIVITY

Range site and map symbols	Potential natural plant community		Potential annual production for kind of growing season		
	Common plant name	Composition	Favorable	Average	Unfavorable
		Pct	Lb/acre	Lb/acre	Lb/acre
Clayey----- Belfield part of BeA; OaB; OaC; Opal part of OdC, OhB, OsC, SbE, and SdD; PrA; PrB; Regent part of RpC; RnA; RnB; SgA; SgB	Western wheatgrass-----	50	2,500	2,100	1,500
	Green needlegrass-----	20			
	Blue grama-----	5			
	Little bluestem-----	5			
	Big bluestem-----	5			
	Bluegrasses-----	5			
	Sedges-----	5			
	Climax forbs-----	5			
Clayey Overflow----- Wt	Western wheatgrass-----	60	3,600	3,000	2,100
	Green needlegrass-----	20			
	Buffalograss-----	5			
	Blue grama-----	5			
	Sedges-----	5			
	Climax forbs-----	5			
Claypan----- DaA; Daglum part of BeA, RsB, and RtB; PaB; Parchin part of BrB, BsB, BzB, ExB, and PbD	Western wheatgrass-----	40	1,800	1,500	1,100
	Green needlegrass-----	20			
	Blue grama-----	15			
	Needleandthread-----	10			
	Buffalograss-----	5			
	Sedges-----	5			
	Climax forbs-----	5			
Closed Depression----- Hs; Mc	Western wheatgrass-----	85	3,000	2,700	1,900
	Sedges-----	5			
	Sideoats grama-----	5			
	Climax forbs-----	5			
Dense Clay----- BlA; Bullcreek part of BmA; Dupree part of DuD, OdC, and SdD	Western wheatgrass-----	60	2,000	1,500	900
	Green needlegrass-----	30			
	Sedges-----	5			
	Climax forbs-----	5			
Loamy Overflow----- An; Gr; Gs; Hf; Hg; Ka; Kc; Th; Tm	Big bluestem-----	40	3,800	3,200	2,200
	Green needlegrass-----	15			
	Western wheatgrass-----	10			
	Switchgrass-----	10			
	Little bluestem-----	10			
	Sedges-----	5			
	Climax forbs-----	5			
	Climax shrubs-----	5			
Loamy Terrace----- Hn; Havrelon part of HrA; Tt	Western wheatgrass-----	30	3,240	2,700	1,900
	Green needlegrass-----	30			
	Little bluestem-----	10			
	Needleandthread-----	5			
	Big bluestem-----	5			
	Blue grama-----	5			
	Sedges-----	5			
	Climax forbs-----	5			
	Climax shrubs-----	5			
Saline Lowland----- Ge; Glenross part of Gk; Hd; La	Western wheatgrass-----	40	2,800	2,500	2,000
	Nuttall alkaligrass-----	20			
	Prairie cordgrass-----	10			
	Alkali cordgrass-----	10			
	Inland saltgrass-----	10			
	Blue grama-----	5			
	Climax forbs-----	5			

TABLE 7.--RANGELAND CHARACTERISTIC VEGETATION AND PRODUCTIVITY--Continued

Range site and map symbols	Potential natural plant community		Potential annual production for kind of growing season		
	Common plant name	Composition	Favorable	Average	Unfavorable
		Pct	Lb/acre	Lb/acre	Lb/acre
Sands----- Bd; TdA; Telfer part of BzB, FtF, and TeB; ZeB; Zeona part of ZsD	Sand bluestem-----	30	2,900	2,400	1,700
	Prairie sandreed-----	20			
	Little bluestem-----	20			
	Needleandthread-----	10			
	Switchgrass-----	5			
	Sedges-----	5			
	Climax forbs-----	5			
	Climax shrubs-----	5			
Sandy----- EkA; Ekalaka part of Gk and TeB; EpB; EvB; Evridge part of EwB and ExB; PeA; TaA; VaA; VeB; Vebar part of CvD and VhB	Needleandthread-----	20	2,800	2,300	1,600
	Prairie sandreed-----	20			
	Sand bluestem-----	15			
	Little bluestem-----	15			
	Western wheatgrass-----	10			
	Sedges-----	5			
	Sideoats grama-----	5			
	Climax forbs-----	5			
Shallow----- Caba part of CaF, Cbd, CeE, CgF, PdD, Rcb, RcC, and RzF; Cohagen part of CgF, CvD, and VhB; Flasher part of FrF and FtF; Wayden part of RpC; WcE; WdE	Little bluestem-----	40	1,900	1,600	1,100
	Sideoats grama-----	15			
	Needleandthread-----	10			
	Prairie sandreed-----	10			
	Green needlegrass-----	5			
	Plains muhly-----	5			
	Western wheatgrass-----	5			
	Sedges-----	5			
Shallow Clay----- Sansarc part of OsC, SbE, SdD, and SeE	Climax forbs-----	5	1,900	1,600	1,100
	Western wheatgrass-----	30			
	Little bluestem-----	25			
	Sideoats grama-----	15			
	Green needlegrass-----	10			
	Big bluestem-----	10			
	Sedges-----	5			
	Climax forbs-----	5			
Shallow to Gravel----- LeA; LeB	Needleandthread-----	30	1,700	1,400	800
	Blue grama-----	25			
	Threadleaf sedge-----	15			
	Western wheatgrass-----	5			
	Sideoats grama-----	5			
	Little bluestem-----	5			
	Plains muhly-----	5			
	Climax forbs-----	5			
Silty----- Amor part of CaF; BfA; BfB; Bryant part of BgB and BgC; FaA; FaB; RaA; RaB; RaC; Reeder part of Cbd, Rcb, RcC, and RhB; ShA; Shambo part of CeE; ShB; ShC; StA; StB	Climax shrubs-----	5	2,600	2,200	1,500
	Western wheatgrass-----	35			
	Green needlegrass-----	20			
	Needleandthread-----	15			
	Sideoats grama-----	5			
	Big bluestem-----	5			
	Little bluestem-----	5			
	Sedges-----	5			
	Climax forbs-----	5			
	Climax shrubs-----	5			

TABLE 7.--RANGELAND CHARACTERISTIC VEGETATION AND PRODUCTIVITY--Continued

Range site and map symbols	Potential natural plant community		Potential annual production for kind of growing season		
	Common plant name	Composition	Favorable	Average	Unfavorable
		Pct	Lb/acre	Lb/acre	Lb/acre
Thin Claypan----- BnA; Bullock part of BrB, BsB, BuB, BvE, BzB, EwB, and PdD; HuB; Hurley part of HwA and OhB; Rhoades part of HrA, RhB, RsB, RtB, RuB, and RvE; RrA	Western wheatgrass-----	35	1,200	1,000	600
	Blue grama-----	25			
	Buffalograss-----	10			
	Needleandthread-----	10			
	Saltgrass-----	5			
	Sedges-----	5			
	Climax forbs-----	5			
	Climax shrubs-----	5			
Thin Upland----- Sutley part of BgB and BgC	Needleandthread-----	20	2,200	1,800	1,300
	Little bluestem-----	20			
	Sideoats grama-----	15			
	Western wheatgrass-----	15			
	Plains muhly-----	10			
	Blue grama-----	5			
	Prairie sandreed-----	5			
	Threadleaf sedge-----	5			
	Climax forbs-----	5			
Very Shallow----- Wabek part of SeE; WaD	Blue grama-----	30	1,200	1,000	600
	Needleandthread-----	20			
	Threadleaf sedge-----	15			
	Little bluestem-----	5			
	Red threeawn-----	5			
	Sand dropseed-----	5			
	Sideoats grama-----	5			
	Western wheatgrass-----	5			
	Climax forbs-----	5			
	Climax shrubs-----	5			

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

(The symbol < means less than; > means more than)

Windbreak suitability group and map symbols	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
Group 1----- An; Gr; Gs; HF; Hg; Ka; Kc; Parshall part of EpB; PaA; Th; Tm	Peking cotoneaster, European cotoneaster, American plum, silver buffaloberry, late lilac, common lilac, Hansen hedgerose, redosier dogwood, skunkbush sumac, western sandcherry, golden currant, Nanking cherry, Amur honeysuckle, Mongolian cherry.	Siberian crabapple, common chokecherry, honeysuckle, eastern redcedar, Siberian peashrub, blue spruce, Rocky Mountain juniper, Ussurian pear, Siberian apricot, Amur maple.	Golden willow, ponderosa pine, Black Hills spruce, green ash, white willow, Russian mulberry, hackberry, bur oak, Russian-olive.	Siberian elm	Eastern cottonwood, northwest poplar, Carolina poplar, robusta poplar.
Group 2*.					
Group 3----- BfA; BfB; Bryant part of BgB and BgC; FaA; FaB; Havrelon part of HrA; Hn; SgA; SgB; ShA; ShB; ShC	American plum, late lilac, common lilac, silver buffaloberry, redosier dogwood, Hansen hedgerose, Peking cotoneaster, European cotoneaster, skunkbush sumac, golden currant, Nanking cherry, Mongolian cherry, western sandcherry.	Manchurian crabapple, eastern redcedar, common chokecherry, Siberian peashrub, Amur honeysuckle, common lilac, blue spruce, bur oak, boxelder, green ash, hackberry, Ussurian pear, Siberian apricot, Rocky Mountain juniper, Amur maple.	Black Hills spruce, ponderosa pine, Russian-olive.	Siberian elm	---
Group 4----- Belfield part of BeA; OaB; OaC; Opal part of OdC, OhB, and OsC; PrA; PrB; Regent part of RpC; RnA; RnB; Wt	Siberian peashrub, golden currant, American plum, Tatarian honeysuckle, Amur honeysuckle, common lilac, late lilac, silver buffaloberry, Peking cotoneaster, Russian almond, European cotoneaster, Nanking cherry, skunkbush sumac.	Ponderosa pine, green ash, eastern redcedar, Russian- olive, Rocky Mountain juniper, common chokecherry, hackberry, Manchurian crabapple, Ussurian pear, Siberian apricot.	Siberian elm-----	---	---
Group 5----- EkA; Ekakaka part of EpB, Gk, and TeB; EvB; Evridge part of EwB and ExB; TaA; TdA; Telfer part of BzB and TeB; Tt	Amur honeysuckle, silver buffaloberry, common lilac, late lilac, American plum, Peking cotoneaster, European cotoneaster, skunkbush sumac, western sandcherry.	Eastern redcedar, Siberian crabapple, common chokecherry, Siberian peashrub, Rocky Mountain juniper.	Ponderosa pine, Russian-olive, green ash, hackberry.	Siberian elm	---

See footnotes at end of table.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Windbreak suitability group and map symbols	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
Group 6----- LeA; LeB; RaA; RaB; RaC; Reeder part of CbD, RcB, RcC, and RhB; StA; StB; VeA; VeB; Vebar part of CvD and VhB	Peking cotoneaster, European cotoneaster, Amur honeysuckle, common lilac, late lilac, Russian almond.	Ponderosa pine, eastern redcedar, Rocky Mountain juniper, Russian- olive.	Siberian elm-----	---	---
Group 7----- Bd; ZeB	---	Ponderosa pine, eastern redcedar, Rocky Mountain juniper.	---	---	---
Group 8----- Sutley part of BgB and BgC	Amur honeysuckle, Siberian peashrub, Peking cotoneaster, silver buffaloberry, European cotoneaster, common lilac, late lilac.	Ponderosa pine, Russian-olive, green ash, Rocky Mountain juniper, eastern redcedar, Ussurian pear.	Siberian elm-----	---	---
Group 9----- DaA; Daglum part of BeA, ReB, and RtB; PaB; Parchin part of BrB, BsB, BzB, and ExB	Russian-olive, eastern redcedar, Rocky Mountain juniper, Siberian peashrub, silver buffaloberry, common lilac, Amur honeysuckle, Ussurian pear.	Siberian elm, ponderosa pine, green ash.	---	---	---
Group 10**. Bb; BlA; BmA; BnA; Bullock part of BrB, BsB, BzB, EwB, and PdD; BuB; BvE; Cabba part of CbD, PdD, RcB, and RcC; CaF; CeE; CgF; Cohagen part of CvD and VhB; DuD; Dupree part of GdC; FrF; FtF; Ge; Glenross part of Gk; Hd; Hs; HuB; Hurley part of OhB; HwA; La; Mc; Pg; Rhoades part of HrA, RhB, RsB, RtB, and RrA; RuB; RvE; RzF; Sansarc part of OsC; SbE; SdD; SeE; Slickspots part of BsB and RtB; WaD; Wayden part of RpC; WcE; WdE; ZsD					

* No soils in Corson County are in this group.

** Soils in this group generally are not suited to trees.

TABLE 9.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements								
	Grain and seed crops	Grasses and legumes	Native herbaceous plants	Planted trees and shrubs	Native deciduous trees	Native coniferous plants	Native shrubs	Wetland plants	Shallow water areas
An----- Arnegard	Good	Good	Good	Good	Good	Poor	Fair	Very poor.	Very poor.
Bb*----- Badland	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Bd----- Banks	Very poor.	Very poor.	Fair	Poor	Poor	Very poor.	Fair	Very poor.	Very poor.
BeA*: Belfield-----	Fair	Fair	Good	Good	Poor	Very poor.	Poor	Poor	Very poor.
Daglum-----	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Poor.
BfA----- Bryant	Good	Good	Good	Good	Poor	Very poor.	Fair	Very poor.	Very poor.
BfB----- Bryant	Good	Good	Good	Good	Poor	Very poor.	Fair	Very poor.	Very poor.
BgB*: Bryant-----	Good	Good	Good	Good	Poor	Very poor.	Fair	Very poor.	Very poor.
Sutley-----	Fair	Fair	Fair	Poor	Very poor.	Very poor.	Poor	Very poor.	Very poor.
BgC*: Bryant-----	Fair	Good	Good	Good	Poor	Very poor.	Fair	Very poor.	Very poor.
Sutley-----	Good	Fair	Fair	Poor	Very poor.	Very poor.	Poor	Very poor.	Very poor.
BlA----- Bullcreek	Very poor.	Very poor.	Poor	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.
BmA*: Bullcreek-----	Very poor.	Very poor.	Poor	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.
Slickspots-----	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
BnA----- Bullock	Very poor.	Poor	Poor	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.
BrB*: Bullock-----	Very poor.	Poor	Poor	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.
Parchin-----	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Fair	Very poor.	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								
	Grain and seed crops	Grasses and legumes	Native herba- ceous plants	Planted trees and shrubs	Native decid- uous trees	Native conif- erous plants	Native shrubs	Wetland plants	Shallow water areas
BsB*:									
Bullock-----	Very poor.	Poor	Poor	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.
Parchin-----	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Fair	Very poor.	Very poor.
Slickspots-----	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
BuB*:									
Bullock-----	Very poor.	Poor	Poor	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.
Slickspots-----	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
BvE*:									
Bullock-----	Very poor.	Poor	Poor	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.
Slickspots-----	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Rock outcrop-----	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
BzB*:									
Bullock-----	Very poor.	Poor	Poor	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.
Telfer-----	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Very poor.	Very poor.
Parchin-----	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Very poor.	Very poor.
CaF*:									
Cabba-----	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Amor-----	Very poor.	Very poor.	Good	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
CbD*:									
Cabba-----	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Reeder-----	Poor	Good	Good	Poor	Poor	Very poor.	Fair	Very poor.	Very poor.
CeE*:									
Cabba-----	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Shambo-----	Very poor.	Very poor.	Good	Very poor.	Poor	Very poor.	Fair	Very poor.	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								
	Grain and seed crops	Grasses and legumes	Native herbaceous plants	Planted trees and shrubs	Native deciduous trees	Native coniferous plants	Native shrubs	Wetland plants	Shallow water areas
CgF*:									
Cohagen-----	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Cabba-----	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Rock outcrop-----	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
CvD*:									
Cohagen-----	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Vebar-----	Poor	Fair	Good	Poor	Very poor.	Very poor.	Poor	Very poor.	Very poor.
DaA-----	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Poor.
Daglum									
DuD*:									
Dupree-----	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Rock outcrop-----	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
EkA-----	Poor	Fair	Good	Fair	Very poor.	Very poor.	Fair	Very poor.	Very poor.
Ekalaka									
EpB*:									
Ekalaka-----	Poor	Fair	Good	Fair	Very poor.	Very poor.	Fair	Very poor.	Very poor.
Parshall-----	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Very poor.	Very poor.
EvB-----	Poor	Fair	Good	Fair	Very poor.	Very poor.	Fair	Very poor.	Very poor.
Evridge									
EWB*:									
Evridge-----	Poor	Fair	Good	Fair	Very poor.	Very poor.	Fair	Very poor.	Very poor.
Bullock-----	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
ExB*:									
Evridge-----	Poor	Fair	Good	Fair	Very poor.	Very poor.	Fair	Very poor.	Very poor.
Parchin-----	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Fair	Very poor.	Very poor.
FaA, FaB-----	Good	Good	Good	Good	Poor	Very poor.	Very poor.	Very poor.	Very poor.
Farnuf									

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								
	Grain and seed crops	Grasses and legumes	Native herba- ceous plants	Planted trees and shrubs	Native decid- uous trees	Native conif- erous plants	Native shrubs	Wetland plants	Shallow water areas
FrF*:									
Flasher-----	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Rock outcrop-----	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
FtF*:									
Flasher-----	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Telfer-----	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Fair	Very poor.	Very poor.
Ge-----	Very poor.	Very poor.	Fair	Very poor.	Poor	Very poor.	Poor	Fair	Fair.
Glenross									
Gk*:									
Glenross-----	Very poor.	Very poor.	Fair	Very poor.	Poor	Very poor.	Poor	Fair	Fair.
Ekalaka-----	Poor	Fair	Good	Fair	Poor	Very poor.	Fair	Poor	Very poor.
Gr-----	Good	Good	Good	Good	Good	Poor	Good	Very poor.	Very poor.
Grail									
Gs-----	Good	Good	Good	Good	Good	Poor	Good	Poor	Very poor.
Grassna									
Hd-----	Very poor.	Poor	Fair	Very poor.	Poor	Poor	Very poor.	Good	Fair.
Harriet									
Hf-----	Good	Good	Good	Good	Fair	Poor	Good	Poor	Very poor.
Havrelon									
Hg-----	Very poor.	Good	Good	Good	Fair	Poor	Good	Poor	Very poor.
Havrelon									
Hn-----	Good	Good	Good	Good	Fair	Poor	Good	Poor	Very poor.
Havrelon									
HrA*:									
Havrelon-----	Good	Good	Good	Good	Fair	Poor	Good	Poor	Very poor.
Rhoades-----	Very poor.	Poor	Poor	Very poor.	Poor	Very poor.	Very poor.	Poor	Poor.
Hs-----	Very poor.	Poor	Poor	Very poor.	Poor	Poor	Very poor.	Good	Good.
Heil									
HuB-----	Very poor.	Poor	Poor	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.
Hurley									

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								
	Grain and seed crops	Grasses and legumes	Native herbaceous plants	Planted trees and shrubs	Native deciduous trees	Native coniferous plants	Native shrubs	Wetland plants	Shallow water areas
HwA*: Hurley-----	Very poor.	Poor	Poor	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.
Slickspots-----	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Ka----- Korchea	Good	Good	Good	Good	Fair	Fair	Fair	Very poor.	Very poor.
Kc----- Korchea	Very poor.	Good	Good	Good	Good	Fair	Fair	Very poor.	Very poor.
La----- Lallie	Very poor.	Very poor.	Fair	Very poor.	Poor	Poor	Very poor.	Poor	Good.
LaA, LeB----- Lehr	Poor	Fair	Poor	Poor	Very poor.	Fair	Poor	Very poor.	Very poor.
Mc----- McKenzie	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Poor	Good.
OaB----- Opal	Fair	Fair	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
OaC----- Opal	Poor	Fair	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
OdC*: Opal-----	Poor	Fair	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Dupree-----	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
OhB*: Opal-----	Fair	Fair	Good	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Hurley-----	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
OsC*: Opal-----	Poor	Fair	Good	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Sansarc-----	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Fair	Very poor.	Very poor.
PaB----- Parchin	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Fair	Very poor.	Very poor.
PdD*: Parchin-----	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Fair	Very poor.	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								
	Grain and seed crops	Grasses and legumes	Native herba- ceous plants	Planted trees and shrubs	Native decid- uous trees	Native conif- erous plants	Native shrubs	Wetland plants	Shallow water areas
PdD*:									
Bullock-----	Very poor.	Poor	Poor	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.
Cabba-----	Very poor.	Very poor.	Fair	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.
PeA----- Parshall	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Poor	Very poor.
Pg*----- Pits	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
PrA, PrB----- Promise	Fair	Fair	Good	Fair	Fair	Very poor.	Very poor.	Very poor.	Very poor.
RaA, RaB----- Reeder	Good	Good	Good	Fair	Poor	Very poor.	Fair	Very poor.	Very poor.
RaC----- Reeder	Fair	Good	Good	Fair	Poor	Very poor.	Fair	Very poor.	Very poor.
RcB*:									
Reeder-----	Good	Good	Good	Fair	Poor	Very poor.	Fair	Very poor.	Very poor.
Cabba-----	Very poor.	Fair	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
RcC*:									
Reeder-----	Fair	Good	Good	Fair	Poor	Very poor.	Fair	Very poor.	Very poor.
Cabba-----	Very poor.	Fair	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
RhB*:									
Reeder-----	Good	Good	Good	Fair	Poor	Very poor.	Fair	Very poor.	Very poor.
Rhodes-----	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Poor.
RnA, RnB----- Regent	Good	Good	Good	Fair	Poor	Very poor.	Poor	Poor	Very poor.
RpC*:									
Regent-----	Fair	Good	Good	Poor	Poor	Very poor.	Poor	Poor	Very poor.
Wayden-----	Very poor.	Fair	Fair	Very poor.	Very poor.	Very poor.	Fair	Very poor.	Very poor.
RrA----- Rhodes	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								
	Grain and seed crops	Grasses and legumes	Native herbaceous plants	Planted trees and shrubs	Native deciduous trees	Native coniferous plants	Native shrubs	Wetland plants	Shallow water areas
RsB*:									
Rhoades-----	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Poor.
Daglum-----	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Poor.
RtB*:									
Rhoades-----	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Poor.
Daglum-----	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Poor.
Slickspots-----	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
RuB*:									
Rhoades-----	Very poor.	Poor	Poor	Very poor.	Poor	Very poor.	Very poor.	Poor	Poor.
Slickspots-----	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
RvE*:									
Rhoades-----	Very poor.	Poor	Poor	Very poor.	Poor	Very poor.	Very poor.	Poor	Poor.
Slickspots-----	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Rock outcrop-----	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
RzF*:									
Rock outcrop-----	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Cabba-----	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
SbE*:									
Sansarc-----	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Fair	Very poor.	Very poor.
Opal-----	Very poor.	Very poor.	Good	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
SdD*:									
Sansarc-----	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Fair	Very poor.	Very poor.
Opal-----	Very poor.	Very poor.	Good	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Dupree-----	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								
	Grain and seed crops	Grasses and legumes	Native herba- ceous plants	Planted trees and shrubs	Native decid- uous trees	Native conif- erous plants	Native shrubs	Wetland plants	Shallow water areas
SeE*:									
Sansarc-----	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Fair	Very poor.	Very poor.
Wabek-----	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
SgA, SgB----- Savage	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Poor	Very poor.
ShA, ShB----- Shambo	Good	Good	Good	Good	Poor	Very poor.	Fair	Poor	Very poor.
ShC----- Shambo	Fair	Good	Good	Good	Poor	Very poor.	Fair	Poor	Very poor.
StA, StB----- Stady	Fair	Fair	Good	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
TaA----- Tally	Fair	Fair	Good	Fair	Very poor.	Very poor.	Good	Very poor.	Very poor.
TdA----- Telfer	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Very poor.	Very poor.
TeB*:									
Telfer-----	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Very poor.	Very poor.
Ekalaka-----	Poor	Fair	Good	Fair	Poor	Very poor.	Fair	Poor	Very poor.
Th----- Trembles	Fair	Fair	Good	Good	Fair	Poor	Good	Poor	Very poor.
Tm----- Trembles	Very poor.	Fair	Good	Good	Fair	Poor	Good	Poor	Very poor.
Tt----- Trembles	Fair	Fair	Good	Fair	Fair	Good	Good	Very poor.	Very poor.
VeA, VeB----- Vebar	Fair	Fair	Good	Fair	Very poor.	Very poor.	Poor	Very poor.	Very poor.
VhB*:									
Vebar-----	Fair	Fair	Good	Fair	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Cohagen-----	Very poor.	Fair	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
WaD----- Wabek	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
WcE*:									
Wayden-----	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Fair	Very poor.	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								
	Grain and seed crops	Grasses and legumes	Native herba- ceous plants	Planted trees and shrubs	Native decid- uous trees	Native conif- erous plants	Native shrubs	Wetland plants	Shallow water areas
WcE*: Cabba-----	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
WdE*: Wayden-----	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Fair	Very poor.	Very poor.
Cabba-----	Very poor.	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Wt----- Wendte	Very poor.	Very poor.	Good	Fair	Poor	Very poor.	Poor	Very poor.	Very poor.
ZeB----- Zeona	Very poor.	Very poor.	Fair	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.
ZsD*: Zeona-----	Very poor.	Very poor.	Fair	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.
Slickspots-----	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Rock outcrop-----	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
An----- Arnegard	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight-----	Moderate: shrink-swell.	Severe: low strength.
Bb*. Badland					
Bd----- Banks	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
BeA*: Belfield-----	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Daglum-----	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
BfA----- Bryant	Slight-----	Slight-----	Slight-----	Slight-----	Moderate: low strength, frost action.
BfB----- Bryant	Slight-----	Slight-----	Slight-----	Moderate: slope.	Moderate: low strength, frost action.
BgB*, BgC*: Bryant-----	Slight-----	Slight-----	Slight-----	Moderate: slope.	Moderate: low strength, frost action.
Sutley-----	Slight-----	Slight-----	Slight-----	Moderate: slope.	Moderate: frost action.
BlA----- Bullcreek	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
BmA*: Bullcreek-----	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Slickspots.					
BnA----- Bullock	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, shrink-swell.
BrB*: Bullock-----	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, shrink-swell.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
BrB*: Parchin-----	Slight-----	Slight-----	Slight-----	Moderate: slope.	Moderate: low strength.
BsB*: Bullock-----	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, shrink-swell.
Parchin-----	Slight-----	Slight-----	Slight-----	Moderate: slope.	Moderate: low strength.
Slickspots.					
BuB*: Bullock-----	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, shrink-swell.
Slickspots.					
BvE*: Bullock-----	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, shrink-swell.
Slickspots.					
Rock outcrop.					
BzB*: Bullock-----	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, shrink-swell.
Telfer-----	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Slight.
Parchin-----	Slight-----	Slight-----	Slight-----	Moderate: slope.	Moderate: low strength.
CaF*: Cabba-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Amor-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
CbD*: Cabba-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Reeder-----	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.
CeE*: Cabba-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
CeE*: Shambo-----	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, low strength, slope.
CgF*: Cohagen-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Cabba-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
CvD*: Cohagen-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Vebar-----	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Slight.
DaA----- Daglum	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
DuD*: Dupree-----	Severe: slope.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell.	Severe: low strength, slope, shrink-swell.
Rock outcrop.					
Eka----- Ekalaka	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Moderate: frost action.
EpB*: Ekalaka-----	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Moderate: frost action.
Parshall-----	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Moderate: frost action.
EvB----- Evridge	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Slight.
EwB*: Evridge-----	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Slight.
Bullock-----	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: low strength, shrink-swell.
ExB*: Evridge-----	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Slight.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
ExB*: Parchin-----	Slight-----	Slight-----	Slight-----	Moderate: slope.	Moderate: low strength.
FaA----- Farnuf	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.
FaB----- Farnuf	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.
FrF*: Flasher-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
FtF*: Flasher-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Telfer-----	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ge----- Glenross	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.
Gk*: Glenross-----	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.
Ekalaka-----	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Moderate: frost action.
Gr----- Grail	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.
Gs----- Grassna	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.
Hd----- Harriet	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, low strength.
Hf----- Havrelon	Slight-----	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.
Hg----- Havrelon	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.
Hn----- Havrelon	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
HrA*: Havrelon-----	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.
Rhoades-----	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Hs----- Heil	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.
HuB----- Hurley	Moderate: depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
HwA*: Hurley-----	Moderate: depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Slickspots.					
Ka----- Korchea	Slight-----	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: low strength, flooding, shrink-swell.
Kc----- Korchea	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
La----- Lallie	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.
LeA----- Lehr	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Slight.
LeB----- Lehr	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Slight.
Mc----- McKenzie	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.
OaB, OaC----- Opal	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.
OdC*: Opal-----	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
OdC*: Dupree-----	Slight-----	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
OhB*: Opal-----	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.
Hurley-----	Moderate: depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
OsC*: Opal-----	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.
Sansarc-----	Moderate: slope.	Severe: shrink-swell.	Severe: shrink-swell, depth to rock.	Severe: slope, shrink-swell.	Severe: shrink-swell, low strength.
PaB----- Parchin	Slight-----	Slight-----	Slight-----	Moderate: slope.	Moderate: low strength.
PdD*: Parchin-----	Slight-----	Slight-----	Slight-----	Moderate: slope.	Moderate: low strength.
Bullock-----	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: low strength, shrink-swell.
Cabba-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PeA----- Parshall	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Moderate: frost action.
Pg*. Pits					
PrA, PrB----- Promise	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.
RaA----- Reeder	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.
RaB, RaC----- Reeder	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.
RcB*, RcC*: Reeder-----	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
RcB*, RcC*: Cabba-----	Slight-----	Slight-----	Slight-----	Moderate: slope.	Moderate: low strength.
RhB*: Reeder-----	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.
Rhoades-----	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
RnA, RnB----- Regent	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
RpC*: Regent-----	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Wayden-----	Moderate: slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
RrA----- Rhoades	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
RsB*: Rhoades-----	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Daglun-----	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
RtB*: Rhoades-----	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Daglun-----	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Slickspots.					
RuB*: Rhoades-----	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Slickspots.					

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
RvE*: Rhoades-----	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Slickspots.					
Rock outcrop.					
RzF*: Rock outcrop.					
Cabba-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
SbE*: Sansarc-----	Severe: slope.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell, depth to rock.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell, low strength.
Opal-----	Severe: slope, cutbanks cave.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell, low strength.
SdD*: Sansarc-----	Severe: slope.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell, depth to rock.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell, low strength.
Opal-----	Severe: slope, cutbanks cave.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell, low strength.
Dupree-----	Severe: slope.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell.	Severe: low strength, slope, shrink-swell.
SeE*: Sansarc-----	Severe: slope.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell, depth to rock.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell, low strength.
Wabek-----	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
SgA, SgB----- Savage	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.
ShA----- Shambo	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, low strength.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
ShB, ShC----- Shambo	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, low strength.
StA----- Stady	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Moderate: frost action.
StB----- Stady	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Moderate: frost action.
TaA----- Tally	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Moderate: frost action.
TdA----- Telfer	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Slight.
TeB*: Telfer-----	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Slight.
Ekalaka-----	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Moderate: frost action.
Th----- Trembles	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Moderate: frost action.
Tm----- Trembles	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Tt----- Trembles	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Moderate: frost action.
VeA----- Vebar	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Slight.
VeB----- Vebar	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Slight.
VhB*: Vebar-----	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Slight.
Cohagen-----	Slight-----	Slight-----	Slight-----	Moderate: slope.	Moderate: frost action.
WaD----- Wabek	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
WcE*: Wayden-----	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Cabba-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
WdE*: Wayden-----	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Cabba-----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Wt----- Wendte	Moderate: flooding, too clayey.	Severe: shrink-swell, flooding.	Severe: shrink-swell, flooding.	Severe: shrink-swell, flooding.	Severe: shrink-swell, low strength, flooding.
ZeB----- Zeona	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Slight.
ZsD*: Zeona-----	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Slight.
Slickspots.					
Rock outcrop.					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
An----- Arnegard	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight-----	Fair: too clayey.
Bb*. Badland					
Bd----- Banks	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, too sandy.	Severe: flooding, seepage.	Poor: seepage, too sandy.
BeA*: Belfield-----	Severe: percs slowly.	Moderate: seepage.	Severe: seepage, too clayey, excess sodium.	Slight-----	Poor: too clayey, hard to pack, excess sodium.
Daglum-----	Severe: percs slowly.	Slight-----	Severe: too clayey, excess sodium.	Slight-----	Poor: too clayey, excess sodium.
BfA----- Bryant	Slight-----	Moderate: seepage.	Moderate: too clayey.	Slight-----	Fair: too clayey.
BfB----- Bryant	Slight-----	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----	Fair: too clayey.
BgB*: Bryant-----	Slight-----	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----	Fair: too clayey.
Sutley-----	Slight-----	Moderate: slope, seepage.	Slight-----	Slight-----	Good.
BgC*: Bryant-----	Slight-----	Severe: slope.	Moderate: too clayey.	Slight-----	Fair: too clayey.
Sutley-----	Slight-----	Severe: slope.	Slight-----	Slight-----	Good.
BlA----- Bullcreek	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight-----	Poor: too clayey, hard to pack.
BmA*: Bullcreek-----	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight-----	Poor: too clayey, hard to pack.
Slickspots.					

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
BnA----- Bullock	Severe: thin layer, seepage, percs slowly.	Severe: seepage.	Severe: seepage.	Slight-----	Poor: area reclaim, thin layer.
BrB*: Bullock-----	Severe: thin layer, seepage, percs slowly.	Severe: seepage.	Severe: seepage.	Slight-----	Poor: area reclaim, thin layer.
Parchin-----	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage.	Slight-----	Poor: area reclaim, thin layer.
BsB*: Bullock-----	Severe: thin layer, seepage, percs slowly.	Severe: seepage.	Severe: seepage.	Slight-----	Poor: area reclaim, thin layer.
Parchin-----	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage.	Slight-----	Poor: area reclaim, thin layer.
Slickspots.					
BuB*: Bullock-----	Severe: thin layer, seepage, percs slowly.	Severe: seepage.	Severe: seepage.	Slight-----	Poor: area reclaim, thin layer.
Slickspots.					
BvE*: Bullock-----	Severe: thin layer, seepage, percs slowly.	Severe: seepage.	Severe: seepage.	Slight-----	Poor: area reclaim, thin layer.
Slickspots.					
Rock outcrop.					
BzB*: Bullock-----	Severe: thin layer, seepage, percs slowly.	Severe: seepage.	Severe: seepage.	Slight-----	Poor: area reclaim, thin layer.
Telfer-----	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy.
Parchin-----	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage.	Slight-----	Poor: area reclaim, thin layer.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CaF*:					
Cabba-----	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope.
Amor-----	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: slope.	Poor: area reclaim, slope, thin layer.
CbD*:					
Cabba-----	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope.
Reeder-----	Severe: thin layer, seepage.	Severe: seepage, slope.	Severe: seepage.	Moderate: seepage.	Poor: area reclaim, thin layer.
CeE*:					
Cabba-----	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope.
Shambo-----	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
CgF*:					
Cohagen-----	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope, thin layer.
Cabba-----	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope.
Rock outcrop.					
CvD*:					
Cohagen-----	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope, thin layer.
Vebar-----	Severe: thin layer, seepage.	Severe: seepage, slope.	Severe: seepage.	Moderate: seepage.	Poor: area reclaim, thin layer.
DaA-----	Severe:	Slight-----	Severe:	Slight-----	Poor:
Daglum	percs slowly.		too clayey, excess sodium.		too clayey, excess sodium.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
DuD*: Dupree-----	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, too clayey, hard to pack.
Rock outcrop.					
EkA----- Ekalaka	Severe: percs slowly.	Severe: seepage.	Severe: depth to rock, seepage, too sandy.	Severe: seepage.	Poor: too sandy, excess sodium.
EpB*: Ekalaka-----	Severe: percs slowly.	Severe: seepage.	Severe: depth to rock, seepage, too sandy.	Severe: seepage.	Poor: too sandy, excess sodium.
Parshall-----	Slight-----	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too sandy.
EvB----- Evridge	Severe: thin layer, seepage, percs slowly.	Severe: seepage.	Severe: seepage, excess sodium.	Severe: seepage.	Poor: excess sodium, area reclaim.
EwB*: Evridge-----	Severe: thin layer, seepage, percs slowly.	Severe: seepage.	Severe: seepage, excess sodium.	Severe: seepage.	Poor: excess sodium, area reclaim.
Bullock-----	Severe: thin layer, seepage, percs slowly.	Severe: seepage.	Severe: seepage.	Slight-----	Poor: area reclaim, thin layer.
ExB*: Evridge-----	Severe: thin layer, seepage, percs slowly.	Severe: seepage.	Severe: seepage, excess sodium.	Severe: seepage.	Poor: excess sodium, area reclaim.
Parchin-----	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage.	Slight-----	Poor: area reclaim, thin layer.
FaA----- Farnuf	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight-----	Fair: too clayey.
FaB----- Farnuf	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----	Fair: too clayey.
FrF*: Flasher-----	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope, thin layer.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
FrF*: Rock outcrop.					
FtF*: Flasher-----	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope, thin layer.
Telfer-----	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: too sandy, slope.
Ge----- Glenross	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: wetness, excess salt, excess sodium.
Gk*: Glenross-----	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: wetness, excess salt, excess sodium.
Ekalaka-----	Severe: percs slowly.	Severe: seepage.	Severe: depth to rock, seepage, too sandy.	Severe: seepage.	Poor: too sandy, excess sodium.
Gr----- Grail	Severe: percs slowly.	Slight-----	Severe: too clayey.	Slight-----	Poor: too clayey, hard to pack.
Gs----- Grassna	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight-----	Fair: too clayey.
Hd----- Harriet	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness, excess sodium.	Severe: flooding, wetness.	Poor: hard to pack, wetness, excess sodium.
Hf----- Havrelon	Moderate: flooding, percs slowly.	Moderate: seepage.	Moderate: flooding, too clayey.	Moderate: flooding.	Fair: too clayey.
Hg----- Havrelon	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Fair: too clayey.
Hn----- Havrelon	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight-----	Fair: too clayey.
HrA*: Havrelon-----	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight-----	Fair: too clayey.
Rhoades-----	Severe: percs slowly.	Moderate: slope.	Severe: too clayey, excess sodium.	Slight-----	Poor: too clayey, hard to pack.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Hs----- Heil	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey, excess sodium.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
HuB----- Hurley	Severe: thin layer, seepage, percs slowly.	Severe: seepage.	Severe: seepage, excess sodium.	Moderate: seepage.	Poor: area reclaim, hard to pack, excess sodium.
HwA*: Hurley-----	Severe: thin layer, seepage, percs slowly.	Severe: seepage.	Severe: seepage, excess sodium.	Moderate: seepage.	Poor: area reclaim, hard to pack, excess sodium.
Slickspots.					
Ka----- Korchea	Moderate: flooding.	Moderate: seepage.	Moderate: flooding, too clayey.	Moderate: flooding.	Fair: too clayey.
Kc----- Korchea	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Fair: too clayey.
La----- Lallie	Severe: flooding, ponding, percs slowly.	Severe: flooding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
LeA, LeB----- Lehr	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Mc----- McKenzie	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
OaB----- Opal	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage, too clayey.	Moderate: seepage.	Poor: area reclaim, too clayey, hard to pack.
OaC----- Opal	Severe: thin layer, seepage.	Severe: slope, seepage.	Severe: seepage, too clayey.	Moderate: seepage.	Poor: area reclaim, too clayey, hard to pack.
OdC*: Opal-----	Severe: thin layer, seepage.	Severe: slope, seepage.	Severe: seepage, too clayey.	Moderate: seepage.	Poor: area reclaim, too clayey, hard to pack.
Dupree-----	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: area reclaim, too clayey, hard to pack.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
OhB*: Opal-----	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage, too clayey.	Moderate: seepage.	Poor: area reclaim, too clayey, hard to pack.
Hurley-----	Severe: thin layer, seepage, percs slowly.	Severe: seepage.	Severe: seepage, excess sodium.	Moderate: seepage.	Poor: area reclaim, hard to pack, excess sodium.
OsC*: Opal-----	Severe: thin layer, seepage.	Severe: slope, seepage.	Severe: seepage, too clayey.	Moderate: seepage.	Poor: area reclaim, too clayey, hard to pack.
Sansarc-----	Severe: thin layer, seepage.	Severe: slope, seepage.	Severe: seepage, too clayey.	Severe: seepage.	Poor: area reclaim, too clayey, hard to pack.
PaB----- Parchin	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage.	Slight-----	Poor: area reclaim, thin layer.
PdD*: Parchin-----	Severe: thin layer, seepage.	Severe: seepage, slope.	Severe: seepage.	Slight-----	Poor: area reclaim, thin layer.
Bullock-----	Severe: thin layer, seepage, percs slowly.	Severe: seepage, slope.	Severe: seepage.	Slight-----	Poor: area reclaim, thin layer.
Cabba-----	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope.
PaA----- Parshall	Slight-----	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too sandy.
Pg*. Pits					
PrA----- Promise	Severe: percs slowly.	Slight-----	Severe: too clayey.	Slight-----	Poor: too clayey, hard to pack.
PrB----- Promise	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight-----	Poor: too clayey, hard to pack.
RaA, RaB----- Reeder	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage.	Moderate: seepage.	Poor: area reclaim, thin layer.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
RaC----- Reeder	Severe: thin layer, seepage.	Severe: seepage, slope.	Severe: seepage.	Moderate: seepage.	Poor: area reclaim, thin layer.
RcB*: Reeder-----	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage.	Moderate: seepage.	Poor: area reclaim, thin layer.
Cabba-----	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: area reclaim.
RcC*: Reeder-----	Severe: thin layer, seepage.	Severe: seepage, slope.	Severe: seepage.	Moderate: seepage.	Poor: area reclaim, thin layer.
Cabba-----	Severe: thin layer, seepage.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: area reclaim.
RhB*: Reeder-----	Severe: thin layer, seepage.	Severe: seepage, slope.	Severe: seepage.	Moderate: seepage.	Poor: area reclaim, thin layer.
Rhoades-----	Severe: percs slowly.	Moderate: seepage, slope.	Severe: seepage, too clayey.	Slight-----	Poor: too clayey, hard to pack.
RnA, RnB----- Regent	Severe: thin layer, seepage, percs slowly.	Severe: seepage.	Severe: seepage, too clayey.	Moderate: seepage.	Poor: area reclaim, too clayey, hard to pack.
RpC*: Regent-----	Severe: thin layer, seepage, percs slowly.	Severe: seepage, slope.	Severe: seepage, too clayey.	Moderate: seepage.	Poor: area reclaim, too clayey, hard to pack.
Wayden-----	Severe: thin layer, seepage.	Severe: seepage, slope.	Severe: seepage, too clayey.	Severe: seepage.	Poor: area reclaim, too clayey, hard to pack.
RrA----- Rhoades	Severe: percs slowly.	Moderate: seepage, slope.	Severe: seepage, too clayey.	Slight-----	Poor: too clayey, hard to pack.
RsB*: Rhoades-----	Severe: percs slowly.	Moderate: seepage, slope.	Severe: seepage, too clayey.	Slight-----	Poor: too clayey, hard to pack.
Daglum-----	Severe: percs slowly.	Moderate: slope.	Severe: too clayey, excess sodium.	Slight-----	Poor: too clayey, excess sodium.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
RtB*:					
Rhoades-----	Severe: percs slowly.	Moderate: seepage, slope.	Severe: seepage, too clayey.	Slight-----	Poor: too clayey, hard to pack.
Daglum-----	Severe: percs slowly.	Moderate: slope.	Severe: too clayey, excess sodium.	Slight-----	Poor: too clayey, excess sodium.
Slickspots.					
RuB*:					
Rhoades-----	Severe: percs slowly.	Moderate: seepage, slope.	Severe: seepage, too clayey.	Slight-----	Poor: too clayey, hard to pack.
Slickspots.					
RvE*:					
Rhoades-----	Severe: percs slowly.	Severe: slope.	Severe: seepage, too clayey.	Slight-----	Poor: too clayey, hard to pack.
Slickspots.					
Rock outcrop.					
RzF*:					
Rock outcrop.					
Cabba-----	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope.
SbE*:					
Sansarc-----	Severe: slope, thin layer, seepage.	Severe: slope, seepage.	Severe: slope, seepage, too clayey.	Severe: slope, seepage.	Poor: area reclaim, too clayey, hard to pack.
Opal-----	Severe: slope, thin layer, seepage.	Severe: slope, seepage.	Severe: seepage, too clayey, slope.	Severe: slope.	Poor: area reclaim, too clayey, hard to pack.
SdD*:					
Sansarc-----	Severe: slope, thin layer, seepage.	Severe: slope, seepage.	Severe: slope, seepage, too clayey.	Severe: slope, seepage.	Poor: area reclaim, too clayey, hard to pack.
Opal-----	Severe: slope, thin layer, seepage.	Severe: slope, seepage.	Severe: seepage, too clayey, slope.	Severe: slope.	Poor: area reclaim, too clayey, hard to pack.
Dupree-----	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, too clayey, hard to pack.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
SeE*: Sansarc-----	Severe: slope, thin layer, seepage.	Severe: slope, seepage.	Severe: slope, seepage, too clayey.	Severe: slope, seepage.	Poor: area reclaim, too clayey, hard to pack.
Wabek-----	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
SgA----- Savage	Severe: percs slowly.	Slight-----	Severe: too clayey.	Slight-----	Poor: too clayey, hard to pack.
SgB----- Savage	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight-----	Poor: too clayey, hard to pack.
ShA----- Shambo	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight-----	Fair: too clayey.
ShB----- Shambo	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----	Fair: too clayey.
ShC----- Shambo	Moderate: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight-----	Fair: too clayey.
StA, StB----- Stady	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
TaA----- Tally	Slight-----	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too sandy.
TdA----- Telfer	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy.
TeB*: Telfer-----	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy.
Ekalaka-----	Severe: percs slowly.	Severe: seepage.	Severe: depth to rock, seepage, too sandy.	Severe: seepage.	Poor: too sandy, excess sodium.
Th----- Trembles	Moderate: flooding.	Severe: seepage, flooding, wetness.	Severe: seepage.	Severe: seepage.	Fair: too sandy.
Tm----- Trembles	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Fair: too sandy.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Tt----- Trembles	Slight-----	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too sandy.
VeA, VeB----- Vebar	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage.	Moderate: seepage.	Poor: area reclaim, thin layer.
VhB*: Vebar-----	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage.	Moderate: seepage.	Poor: area reclaim, thin layer.
Cohagen-----	Severe: thin layer, seepage.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: area reclaim, thin layer.
WaD----- Wabek	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
WcE*: Wayden-----	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope, too clayey.	Severe: seepage, slope.	Poor: area reclaim, too clayey, hard to pack.
Cabba-----	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope.
WdE*: Wayden-----	Severe: thin layer, seepage, slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: area reclaim, hard to pack, large stones.
Cabba-----	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Wt----- Wendte	Severe: percs slowly, flooding.	Severe: flooding.	Severe: too clayey, flooding.	Severe: flooding.	Poor: too clayey, hard to pack.
ZeB----- Zeona	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Slight-----	Poor: seepage, too sandy.
ZsD*: Zeona-----	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Slight-----	Poor: seepage, too sandy.
Slickspots.					
Rock outcrop.					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
An----- Arnegard	Good-----	Improbable: excess fines.	Improbable: excess fines.	Good.
Bb*. Badland				
Bd----- Banks	Good-----	Probable-----	Improbable: too sandy.	Poor: too sandy.
BeA*: Belfield-----	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium, excess salt.
Daglum-----	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
BfA, BfB----- Bryant	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
BgB*, BgC*: Bryant-----	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Sutley-----	Good-----	Improbable: excess fines.	Improbable: excess fines.	Good.
BlA----- Bullcreek	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
BmA*: Bullcreek-----	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Slickspots.				
BnA----- Bullock	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
BrB*: Bullock-----	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
Parchin-----	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, excess sodium.
BsB*: Bullock-----	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
BsB*: Parchin----- Slickspots.	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, excess sodium.
BuB*: Bullock----- Slickspots.	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
BvE*: Bullock----- Slickspots. Rock outcrop.	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
BzB*: Bullock----- Telfer----- Parchin-----	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
	Good-----	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, excess sodium.
CaF*: Cabba----- Amor-----	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
CbD*: Cabba----- Reeder-----	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer.
CeE*: Cabba----- Shambo-----	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
CgF*: Cohagen-----	Poor: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope, thin layer.
Cabba-----	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
Rock outcrop.				
CvD*: Cohagen-----	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope, thin layer.
Vebar-----	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer, small stones.
DaA----- Daglum	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
DuD*: Dupree-----	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, area reclaim.
Rock outcrop.				
EkA----- Ekalaka	Fair: depth to rock, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
EpB*: Ekalaka-----	Fair: depth to rock, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
Parshall-----	Good-----	Improbable: excess fines.	Improbable: excess fines.	Good.
EvB----- EvrIDGE	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
EWB*: EvrIDGE-----	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
Bullock-----	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
ExB*: EvrIDGE-----	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
ExB*: Parchin-----	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, excess sodium.
FaA, FaB----- Farnuf	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
FrF*: Flasher-----	Poor: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, thin layer, slope.
Rock outcrop.				
FtF*: Flasher-----	Poor: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, thin layer, slope.
Telfer-----	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
Ge----- Glenross	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt, wetness, excess sodium.
Gk*: Glenross-----	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt, wetness, excess sodium.
Ekalaka-----	Fair: depth to rock, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
Gr----- Grail	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Gs----- Grassna	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Hd----- Harriet	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, excess salt, thin layer.
Hf, Hg, Hn----- Havrelon	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
HrA*: Havrelon-----	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
HrA*: Rhoades-----	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
Hs----- Heil	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, excess sodium.
HuB----- Hurley	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, excess sodium, excess salt.
HwA*: Hurley-----	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, excess sodium, excess salt.
Slickspots.				
Ka, Kc----- Korchea	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Good.
La----- Lallie	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt, wetness.
LeA, LeB----- Lehr	Good-----	Probable-----	Probable-----	Poor: small stones, area reclaim.
Mc----- McKenzie	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
OaB, OaC----- Opal	Poor: shrink-swell, low strength, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
OdC*: Opal-----	Poor: shrink-swell, low strength, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Dupree-----	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, area reclaim.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
OhB*: Opal-----	Poor: shrink-swell, low strength, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Hurley-----	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, excess sodium, excess salt.
OsC*: Opal-----	Poor: shrink-swell, low strength, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Sansarc-----	Poor: low strength, shrink-swell, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, area reclaim, thin layer.
PaB----- Parchin	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, excess sodium.
PdD*: Parchin-----	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, excess sodium.
Bullock-----	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
Cabba-----	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
PeA----- Parshall	Good-----	Improbable: excess fines.	Improbable: excess fines.	Good.
Pg*. Pits				
PrA, PrB----- Promise	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
RaA, RaB, RaC----- Reeder	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer.
RcB*, RcC*: Reeder-----	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer.
Cabba-----	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
RhB*: Reeder-----	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer.
Rhoades-----	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
RnA, RnB----- Regent	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
RpC*: Regent-----	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Wayden-----	Poor: area reclaim, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, too clayey, thin layer.
RrA----- Rhoades	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
RsB*: Rhoades-----	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
Daglum-----	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
RtB*: Rhoades-----	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
Daglum-----	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
Slickspots.				
RuB*: Rhoades-----	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
Slickspots.				
RvE*: Rhoades-----	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
RvE*: Slickspots.				
Rock outcrop.				
RzF*: Rock outcrop.				
Cabba-----	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
SbE*: Sansarc-----	Poor: low strength, shrink-swell, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, area reclaim, thin layer.
Opal-----	Poor: shrink-swell, low strength, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
SdD*: Sansarc-----	Poor: low strength, shrink-swell, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, area reclaim, thin layer.
Opal-----	Poor: shrink-swell, low strength, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
Dupree-----	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, area reclaim.
SeE*: Sansarc-----	Poor: low strength, shrink-swell, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, area reclaim, thin layer.
Wabek-----	Poor: slope.	Probable-----	Probable-----	Poor: small stones, area reclaim, slope.
SgA, SgB----- Savage	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
ShA, ShB, ShC----- Shambo	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
StA, StB----- Stady	Good-----	Probable-----	Probable-----	Poor: area reclaim.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
TaA----- Tally	Good-----	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
TdA----- Telfer	Good-----	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
TeB*: Telfer-----	Good-----	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Ekalaka-----	Fair: depth to rock, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
Th, Tm, Tt----- Trembles	Good-----	Improbable: excess fines.	Improbable: excess fines.	Good.
VeA, VeB----- Vebar	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer, small stones.
VhB*: Vebar-----	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer, small stones.
Cohagen-----	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, thin layer.
WaD----- Wabek	Fair: slope.	Probable-----	Probable-----	Poor: small stones, area reclaim, slope.
WcE*: Wayden-----	Poor: area reclaim, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, too clayey, thin layer.
Cabba-----	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
WdE*: Wayden-----	Poor: area reclaim, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones, thin layer.
Cabba-----	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Wt----- Wendte	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
ZeB----- Zeona	Good-----	Probable-----	Improbable: too sandy.	Poor: too sandy.
ZsD*: Zeona-----	Good-----	Probable-----	Improbable: too sandy.	Poor: too sandy.
Slickspots.				
Rock outcrop.				

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
An----- Arnegard	Moderate: seepage.	Severe: piping.	Deep to water	Favorable-----	Favorable-----	Favorable.
Bb*. Badland						
Bd----- Banks	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
BeA*: Belfield-----	Moderate: seepage.	Severe: excess sodium.	Deep to water	Percs slowly, excess sodium.	Percs slowly---	Excess sodium, percs slowly.
Daglum-----	Slight-----	Severe: excess sodium.	Deep to water	Percs slowly---	Percs slowly---	Excess sodium, percs slowly.
BfA----- Bryant	Moderate: seepage.	Severe: piping.	Deep to water	Favorable-----	Erodes easily	Erodes easily.
BfB----- Bryant	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope-----	Erodes easily	Erodes easily.
BgB*, BgC*: Bryant-----	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope-----	Erodes easily	Erodes easily.
Sutley-----	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope-----	Erodes easily	Erodes easily.
BlA----- Bullcreek	Slight-----	Severe: hard to pack.	Deep to water	Droughty, slow intake, percs slowly.	Erodes easily, percs slowly.	Erodes easily, droughty.
BmA*: Bullcreek-----	Slight-----	Severe: hard to pack.	Deep to water	Droughty, slow intake, percs slowly.	Erodes easily, percs slowly.	Erodes easily, droughty.
Slickspots.						
BnA----- Bullock	Moderate: seepage, slope.	Severe: excess sodium.	Deep to water	Slope, droughty, soil blowing.	Area reclaim, erodes easily.	Excess sodium, erodes easily.
BrB*: Bullock-----	Moderate: seepage, slope.	Severe: excess sodium.	Deep to water	Slope, droughty, soil blowing.	Area reclaim, erodes easily.	Excess sodium, erodes easily.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
BrB*: Parchin-----	Moderate: seepage, slope.	Severe: excess sodium.	Deep to water	Slope, soil blowing, percs slowly.	Area reclaim, erodes easily.	Excess sodium, erodes easily.
BsB*: Bullock-----	Moderate: seepage, slope.	Severe: excess sodium.	Deep to water	Slope, droughty, soil blowing.	Area reclaim, erodes easily.	Excess sodium, erodes easily.
Parchin-----	Moderate: seepage, slope.	Severe: excess sodium.	Deep to water	Slope, soil blowing, percs slowly.	Area reclaim, erodes easily.	Excess sodium, erodes easily.
Slickspots.						
BuB*: Bullock-----	Moderate: seepage, slope.	Severe: excess sodium.	Deep to water	Slope, droughty, soil blowing.	Area reclaim, erodes easily.	Excess sodium, erodes easily.
Slickspots.						
BvE*: Bullock-----	Moderate: seepage, slope.	Severe: excess sodium.	Deep to water	Slope, droughty, soil blowing.	Area reclaim, erodes easily.	Excess sodium, erodes easily.
Slickspots.						
Rock outcrop.						
BzB*: Bullock-----	Moderate: seepage, slope.	Severe: excess sodium.	Deep to water	Slope, droughty, soil blowing.	Area reclaim, erodes easily.	Excess sodium, erodes easily.
Telfer-----	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
Parchin-----	Moderate: seepage, slope.	Severe: excess sodium.	Deep to water	Slope, soil blowing, percs slowly.	Area reclaim, erodes easily.	Excess sodium, erodes easily.
CaF*: Cabba-----	Severe: seepage, slope.	Severe: piping, thin layer.	Deep to water	Slope, thin layer.	Slope, area reclaim.	Slope, area reclaim.
Amor-----	Severe: slope.	Severe: piping.	Deep to water	Slope, thin layer.	Slope, area reclaim.	Slope, area reclaim.
CbD*: Cabba-----	Severe: seepage, slope.	Severe: piping, thin layer.	Deep to water	Slope, thin layer.	Slope, area reclaim.	Slope, area reclaim.
Reeder-----	Moderate: seepage, slope.	Severe: piping.	Deep to water	Thin layer, slope.	Area reclaim---	Area reclaim.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
CeE*:						
Cabba-----	Severe: seepage, slope.	Severe: piping, thin layer.	Deep to water	Slope, thin layer.	Slope, area reclaim.	Slope, area reclaim.
Shambo-----	Severe: slope.	Severe: piping.	Deep to water	Slope-----	Slope-----	Slope.
CgF*:						
Cohagen-----	Severe: seepage, slope.	Severe: piping, thin layer.	Deep to water	Slope, soil blowing, thin layer.	Slope, area reclaim, soil blowing.	Slope, area reclaim.
Cabba-----	Severe: seepage, slope.	Severe: piping, thin layer.	Deep to water	Slope, thin layer.	Slope, area reclaim.	Slope, area reclaim.
Rock outcrop.						
CvD*:						
Cohagen-----	Severe: seepage, slope.	Severe: piping, thin layer.	Deep to water	Slope, soil blowing, thin layer.	Slope, area reclaim, soil blowing.	Slope, area reclaim.
Vebar-----	Severe: seepage.	Severe: piping.	Deep to water	Slope, soil blowing, thin layer.	Area reclaim, soil blowing.	Area reclaim.
DaA-----	Slight-----	Severe: excess sodium.	Deep to water	Percs slowly---	Percs slowly---	Excess sodium, percs slowly.
Daglum						
DuD*:						
Dupree-----	Severe: seepage, slope.	Severe: hard to pack, thin layer.	Deep to water	Slope, droughty, slow intake.	Slope, area reclaim, erodes easily.	Slope, erodes easily, droughty.
Rock outcrop.						
EkA-----	Severe: seepage.	Severe: piping, excess sodium.	Deep to water	Droughty, soil blowing.	Too sandy, soil blowing.	Excess sodium, droughty.
Ekalaka						
EpB*:						
Ekalaka-----	Severe: seepage.	Severe: piping, excess sodium.	Deep to water	Droughty, soil blowing.	Too sandy, soil blowing.	Excess sodium, droughty.
Parshall-----	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing, slope.	Too sandy, soil blowing.	Favorable.
EvB-----	Severe: seepage.	Severe: piping, excess sodium.	Deep to water	Slope, droughty, thin layer.	Soil blowing, area reclaim.	Excess sodium, droughty.
Evridge						
EwB*:						
Evridge-----	Severe: seepage.	Severe: piping, excess sodium.	Deep to water	Slope, droughty, thin layer.	Soil blowing, area reclaim.	Excess sodium, droughty.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
EwB*: Bullock-----	Moderate: seepage, slope.	Severe: excess sodium.	Deep to water	Slope, droughty, soil blowing.	Area reclaim, erodes easily.	Excess sodium, erodes easily.
ExB*: Evridge-----	Severe: seepage.	Severe: piping, excess sodium.	Deep to water	Slope, droughty, thin layer.	Soil blowing, area reclaim.	Excess sodium, droughty.
Parchin-----	Moderate: seepage, slope.	Severe: excess sodium.	Deep to water	Slope, soil blowing, percs slowly.	Area reclaim, erodes easily.	Excess sodium, erodes easily.
FaA ----- Farnuf	Moderate: seepage.	Severe: piping.	Deep to water	Favorable-----	Favorable-----	Favorable.
FaB ----- Farnuf	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope-----	Favorable-----	Favorable.
FrF*: Flasher-----	Severe: seepage, slope.	Severe: thin layer.	Deep to water	Slope, soil blowing, thin layer.	Slope, area reclaim, soil blowing.	Slope, area reclaim.
Rock outcrop.						
FtF*: Flasher-----	Severe: seepage, slope.	Severe: thin layer.	Deep to water	Slope, soil blowing, thin layer.	Slope, area reclaim, soil blowing.	Slope, area reclaim.
Telfer-----	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty.
Ge ----- Glenross	Severe: seepage.	Severe: wetness, excess sodium, excess salt.	Percs slowly, flooding, frost action.	Wetness, soil blowing.	Wetness, soil blowing, percs slowly.	Wetness, excess sodium, percs slowly.
Gk*: Glenross-----	Severe: seepage.	Severe: wetness, excess sodium, excess salt.	Percs slowly, flooding, frost action.	Wetness, soil blowing.	Wetness, soil blowing, percs slowly.	Wetness, excess sodium, percs slowly.
Ekalaka-----	Severe: seepage.	Severe: piping, excess sodium.	Deep to water	Droughty, soil blowing.	Too sandy, soil blowing.	Excess sodium, droughty.
Gr ----- Grail	Slight-----	Moderate: piping, hard to pack.	Deep to water	Percs slowly---	Percs slowly---	Percs slowly.
Gs ----- Grassna	Moderate: seepage.	Severe: piping.	Deep to water	Favorable-----	Favorable-----	Favorable.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Hd----- Harriet	Slight-----	Severe: piping, wetness, excess sodium.	Percs slowly, flooding, frost action.	Wetness, percs slowly.	Erodes easily, wetness.	Wetness, excess sodium, erodes easily.
Hf----- Havrelon	Moderate: seepage.	Severe: piping.	Deep to water	Favorable-----	Favorable-----	Favorable.
Hg----- Havrelon	Moderate: seepage.	Severe: piping.	Deep to water	Flooding-----	Favorable-----	Favorable.
Hn----- Havrelon	Moderate: seepage.	Severe: piping.	Deep to water	Favorable-----	Favorable-----	Favorable.
HrA*: Havrelon-----	Moderate: seepage.	Severe: piping.	Deep to water	Favorable-----	Favorable-----	Favorable.
Rhoades-----	Slight-----	Severe: excess sodium.	Deep to water	Percs slowly---	Percs slowly---	Excess sodium, percs slowly.
Hs----- Heil	Slight-----	Severe: hard to pack, ponding, excess sodium.	Ponding, percs slowly, excess salt.	Ponding, percs slowly.	Ponding, percs slowly.	Wetness, excess sodium, percs slowly.
HuB----- Hurley	Moderate: seepage, slope.	Severe: hard to pack, excess sodium.	Deep to water	Slope, droughty, percs slowly.	Area reclaim, erodes easily.	Excess sodium, erodes easily.
HwA*: Hurley-----	Moderate: seepage, slope.	Severe: hard to pack, excess sodium.	Deep to water	Slope, droughty, percs slowly.	Area reclaim, erodes easily.	Excess sodium, erodes easily.
Slickspots.						
Ka----- Korchea	Moderate: seepage.	Severe: piping.	Deep to water	Favorable-----	Favorable-----	Favorable.
Kc----- Korchea	Moderate: seepage.	Severe: piping.	Deep to water	Flooding-----	Favorable-----	Favorable.
La----- Lallie	Slight-----	Severe: hard to pack, ponding.	Ponding, percs slowly, flooding.	Ponding, percs slowly.	Erodes easily, ponding, percs slowly.	Wetness, excess salt, erodes easily.
LeA----- Lehr	Severe: seepage.	Severe: seepage.	Deep to water	Droughty-----	Too sandy-----	Droughty.
LeB----- Lehr	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, slope.	Too sandy-----	Droughty.
Mc----- McKenzie	Slight-----	Severe: hard to pack, ponding.	Ponding, percs slowly.	Ponding, slow intake, percs slowly.	Ponding, percs slowly.	Wetness, excess salt, percs slowly.
OaB, OaC----- Opal	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slow intake, percs slowly, slope.	Area reclaim, erodes easily.	Erodes easily, area reclaim.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
OdC*:						
Opal-----	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slow intake, percs slowly, slope.	Area reclaim, erodes easily.	Erodes easily, area reclaim.
Dupree-----	Severe: seepage.	Severe: hard to pack, thin layer.	Deep to water	Slope, droughty, slow intake.	Area reclaim, erodes easily.	Erodes easily, droughty.
OhB*:						
Opal-----	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slow intake, percs slowly, slope.	Area reclaim, erodes easily.	Erodes easily, area reclaim.
Hurley-----	Moderate: seepage, slope.	Severe: hard to pack, excess sodium.	Deep to water	Slope, droughty, percs slowly.	Area reclaim, erodes easily.	Excess sodium, erodes easily.
OsC*:						
Opal-----	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slow intake, percs slowly, slope.	Area reclaim, erodes easily.	Erodes easily, area reclaim.
Sansarc-----	Severe: seepage, slope.	Severe: hard to pack, thin layer.	Deep to water	Slope, slow intake, droughty.	Slope, area reclaim, erodes easily.	Slope, droughty, erodes easily.
PaB-----	Moderate: seepage, slope.	Severe: excess sodium.	Deep to water	Slope, soil blowing, percs slowly.	Area reclaim, erodes easily.	Excess sodium, erodes easily.
PdD*:						
Parchin-----	Moderate: seepage, slope.	Severe: excess sodium.	Deep to water	Slope, soil blowing, percs slowly.	Area reclaim, erodes easily.	Excess sodium, erodes easily.
Bullock-----	Moderate: seepage, slope.	Severe: excess sodium.	Deep to water	Slope, droughty, soil blowing.	Area reclaim, erodes easily.	Excess sodium, erodes easily.
Cabba-----	Severe: seepage, slope.	Severe: piping, thin layer.	Deep to water	Slope, thin layer.	Slope, area reclaim.	Slope, area reclaim.
PaA-----	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing, slope.	Too sandy, soil blowing.	Favorable.
Pg*.						
Pits						
PrA-----	Slight-----	Severe: hard to pack.	Deep to water	Droughty, slow intake.	Erodes easily, percs slowly.	Erodes easily, droughty.
Promise						
PrB-----	Moderate: slope.	Severe: hard to pack.	Deep to water	Slope, droughty, slow intake.	Erodes easily, percs slowly.	Erodes easily, droughty.
Promise						
RaA-----	Moderate: seepage.	Severe: piping.	Deep to water	Thin layer-----	Area reclaim---	Area reclaim.
Reeder						

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
RaB, RaC----- Reeder	Moderate: seepage, slope.	Severe: piping.	Deep to water	Thin layer, slope.	Area reclaim---	Area reclaim.
RcB*, RcC*: Reeder-----	Moderate: seepage, slope.	Severe: piping.	Deep to water	Thin layer, slope.	Area reclaim---	Area reclaim.
Cabba-----	Severe: seepage.	Severe: piping, thin layer.	Deep to water	Slope, thin layer.	Area reclaim---	Area reclaim.
RhB*: Reeder-----	Moderate: seepage, slope.	Severe: piping.	Deep to water	Thin layer, slope.	Area reclaim---	Area reclaim.
Rhoades-----	Moderate: depth to rock, slope.	Severe: excess sodium.	Deep to water	Percs slowly, slope.	Percs slowly---	Excess sodium, percs slowly.
RnA----- Regent	Moderate: seepage.	Severe: hard to pack.	Deep to water	Percs slowly, thin layer.	Area reclaim, percs slowly.	Area reclaim, percs slowly.
RnB----- Regent	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly, thin layer.	Area reclaim, percs slowly.	Area reclaim, percs slowly.
RpC*: Regent-----	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly, thin layer.	Area reclaim, percs slowly.	Area reclaim, percs slowly.
Wayden-----	Severe: seepage, slope.	Severe: thin layer.	Deep to water	Slope, percs slowly, thin layer.	Slope, area reclaim, percs slowly.	Slope, area reclaim, percs slowly.
RrA----- Rhoades	Moderate: depth to rock, slope.	Severe: excess sodium.	Deep to water	Percs slowly, slope.	Percs slowly---	Excess sodium, percs slowly.
RsB*: Rhoades-----	Moderate: depth to rock, slope.	Severe: excess sodium.	Deep to water	Percs slowly, slope.	Percs slowly---	Excess sodium, percs slowly.
Daglum-----	Moderate: slope.	Severe: excess sodium.	Deep to water	Percs slowly, slope.	Percs slowly---	Excess sodium, percs slowly.
RtB*: Rhoades-----	Moderate: depth to rock, slope.	Severe: excess sodium.	Deep to water	Percs slowly, slope.	Percs slowly---	Excess sodium, percs slowly.
Daglum-----	Moderate: slope.	Severe: excess sodium.	Deep to water	Percs slowly, slope.	Percs slowly---	Excess sodium, percs slowly.
Slickspots.						

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
RuB*: Rhoades-----	Moderate: depth to rock, slope.	Severe: excess sodium.	Deep to water	Percs slowly, slope.	Percs slowly---	Excess sodium, percs slowly.
Slickspots.						
RvE*: Rhoades-----	Moderate: depth to rock, slope.	Severe: excess sodium.	Deep to water	Percs slowly, slope.	Percs slowly---	Excess sodium, percs slowly.
Slickspots.						
Rock outcrop.						
RzF*: Rock outcrop.						
Cabba-----	Severe: seepage, slope.	Severe: piping, thin layer.	Deep to water	Slope, thin layer.	Slope, area reclaim.	Slope, area reclaim.
SbE*: Sansarc-----	Severe: seepage, slope.	Severe: hard to pack, thin layer.	Deep to water	Slope, slow intake, droughty.	Slope, area reclaim, erodes easily.	Slope, droughty, erodes easily.
Opal-----	Severe: slope.	Severe: hard to pack.	Deep to water	Slow intake, percs slowly, slope.	Slope, area reclaim, erodes easily.	Slope, erodes easily, area reclaim.
SdD*: Sansarc-----	Severe: seepage, slope.	Severe: hard to pack, thin layer.	Deep to water	Slope, slow intake, droughty.	Slope, area reclaim, erodes easily.	Slope, droughty, erodes easily.
Opal-----	Severe: slope.	Severe: hard to pack.	Deep to water	Slow intake, percs slowly, slope.	Slope, area reclaim, erodes easily.	Slope, erodes easily, area reclaim.
Dupree-----	Severe: seepage, slope.	Severe: hard to pack, thin layer.	Deep to water	Slope, droughty, slow intake.	Slope, area reclaim, erodes easily.	Slope, erodes easily, droughty.
SeE*: Sansarc-----	Severe: seepage, slope.	Severe: hard to pack, thin layer.	Deep to water	Slope, slow intake, droughty.	Slope, area reclaim, erodes easily.	Slope, droughty, erodes easily.
Wabek-----	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, slope.	Slope, too sandy, soil blowing.	Slope, droughty.
SgA----- Savage	Slight-----	Severe: hard to pack.	Deep to water	Percs slowly, erodes easily.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
SgB----- Savage	Moderate: slope.	Severe: hard to pack.	Deep to water	Percs slowly, slope, erodes easily.	Erodes easily, percs slowly.	Erodes easily, percs slowly.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
ShA----- Shambo	Moderate: seepage.	Severe: piping.	Deep to water	Favorable-----	Favorable-----	Favorable.
ShB, ShC----- Shambo	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope-----	Favorable-----	Favorable.
StA----- Stady	Severe: seepage.	Severe: seepage, piping.	Deep to water	Rooting depth	Too sandy-----	Rooting depth.
StB----- Stady	Severe: seepage.	Severe: seepage, piping.	Deep to water	Rooting depth, slope.	Too sandy-----	Rooting depth.
TaA----- Tally	Severe: seepage.	Severe: seepage, piping.	Deep to water	Soil blowing---	Soil blowing---	Favorable.
TdA----- Telfer	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
TeB*: Telfer-----	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
Ekalaka-----	Severe: seepage.	Severe: piping, excess sodium.	Deep to water	Droughty, soil blowing.	Too sandy, soil blowing.	Excess sodium, droughty.
Th----- Trembles	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing---	Soil blowing---	Favorable.
Tm----- Trembles	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing, flooding.	Too sandy, soil blowing.	Favorable.
Tt----- Trembles	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing---	Too sandy, soil blowing.	Favorable.
VeA----- Vebar	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing, thin layer.	Area reclaim, soil blowing.	Area reclaim.
VeB----- Vebar	Severe: seepage.	Severe: piping.	Deep to water	Slope, soil blowing, thin layer.	Area reclaim, soil blowing.	Area reclaim.
VhB*: Vebar-----	Severe: seepage.	Severe: piping.	Deep to water	Slope, soil blowing, thin layer.	Area reclaim, soil blowing.	Area reclaim.
Cohagen-----	Severe: seepage.	Severe: piping, thin layer.	Deep to water	Slope, soil blowing, thin layer.	Area reclaim, soil blowing.	Area reclaim.
WaD----- Wabek	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, slope.	Slope, too sandy, soil blowing.	Slope, droughty.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
WcE*: Wayden-----	Severe: seepage, slope.	Severe: thin layer.	Deep to water	Slope, percs slowly, thin layer.	Slope, area reclaim, percs slowly.	Slope, area reclaim, percs slowly.
Cabba-----	Severe: seepage, slope.	Severe: piping, thin layer.	Deep to water	Slope, thin layer.	Slope, area reclaim.	Slope, area reclaim.
WdE*: Wayden-----	Severe: seepage, slope.	Severe: hard to pack, large stones, thin layer.	Deep to water	Slope, large stones, percs slowly.	Slope, large stones, area reclaim.	Large stones, slope, area reclaim.
Cabba-----	Severe: depth to rock, slope.	Severe: piping.	Deep to water	Depth to rock, slope, excess salt.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Wt----- Wendte	Slight-----	Severe: hard to pack.	Deep to water	Flooding, percs slowly, slow intake.	Percs slowly---	Percs slowly.
ZeB----- Zeona	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Too arid, droughty.
ZsD*: Zeona-----	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Too arid, droughty.
Slickspots.						
Rock outcrop.						

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
An----- Arnegard	0-9	Loam-----	CL-ML, CL	A-4, A-6	0	100	100	90-100	60-95	20-35	5-20
	9-47	Loam, silt loam, clay loam.	CL	A-6	0	100	100	90-100	60-95	25-40	12-25
	47-60	Loam, clay loam, fine sandy loam.	SM, ML, CL, SC	A-4, A-6	0	100	100	75-95	40-80	15-40	NP-15
Bb*. Badland											
Bd----- Banks	0-3	Fine sand-----	SM, SP-SM	A-2, A-4	0	100	100	60-80	10-40	---	NP
	3-60	Loamy fine sand, fine sand, sand.	SM, SP-SM	A-2	0	100	100	50-70	10-25	---	NP
BeA*: Belfield-----											
	0-10	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	70-100	30-50	10-30
	10-20	Silty clay, silty clay loam, clay loam.	CH, CL	A-7, A-6	0	100	100	90-100	70-100	35-65	15-40
	20-45	Silty clay, silty clay loam, clay loam.	CH, CL	A-6, A-7	0	100	100	90-100	70-100	30-55	10-30
	45-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Daglum-----	0-7	Loam-----	SM, ML, CL-ML, SM-SC	A-4	0	100	100	75-90	45-65	20-30	3-10
	7-25	Clay, silty clay, silty clay loam.	CL, CH	A-7, A-6	0	100	100	90-100	70-95	35-75	15-45
	25-60	Clay, silty clay, clay loam.	CL	A-7, A-6	0	100	100	90-100	65-95	35-50	20-30
BfA, BfB----- Bryant	0-6	Silt loam-----	ML, CL, CL-ML	A-6, A-4	0	100	100	85-100	70-100	25-40	3-15
	6-20	Clay loam, silt loam, silty clay loam.	CL, ML, CL-ML	A-6, A-4	0	100	100	85-100	70-100	25-40	3-15
	20-60	Clay loam, loam, silt loam.	CL, ML, CL-ML	A-6, A-4	0	100	100	85-100	70-100	25-40	3-15
BgB*, BgC*: Bryant-----	0-6	Silt loam-----	ML, CL, CL-ML	A-6, A-4	0	100	100	85-100	70-100	25-40	3-15
	6-20	Clay loam, silt loam, silty clay loam.	CL, ML, CL-ML	A-6, A-4	0	100	100	85-100	70-100	25-40	3-15
	20-60	Clay loam, loam, silt loam.	CL, ML, CL-ML	A-6, A-4	0	100	100	85-100	70-100	25-40	3-15
Sutley-----	0-6	Silt loam-----	ML, CL-ML, CL	A-4	0	100	100	90-100	70-100	25-35	5-10
	6-60	Silt loam, very fine sandy loam.	ML	A-4	0	100	100	90-100	80-100	20-35	NP-8
B1A----- Bullcreek	0-1	Clay-----	MH, CH	A-7	0	95-100	95-100	90-100	85-100	60-100	30-60
	1-10	Clay-----	MH, CH	A-7	0	95-100	95-100	90-100	85-100	70-100	35-60
	10-19	Clay-----	MH, CH	A-7	0	95-100	95-100	90-100	85-100	70-100	35-60
	19-60	Clay-----	CH	A-7	0	95-100	95-100	90-100	85-100	70-100	40-60

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct						
BmA*:											
Bullecreek-----	0-1	Clay-----	MH, CH	A-7	0	95-100	95-100	90-100	85-100	60-100	30-60
	1-10	Clay-----	MH, CH	A-7	0	95-100	95-100	90-100	85-100	70-100	35-60
	10-19	Clay-----	MH, CH	A-7	0	95-100	95-100	90-100	85-100	70-100	35-60
	19-60	Clay-----	CH	A-7	0	95-100	95-100	90-100	85-100	70-100	40-60
Slickspots.											
BnA-----	0-4	Fine sandy loam	SM, ML, SM-SC, CL-ML	A-4	0	100	100	90-100	40-65	25-35	NP-10
Bullock	4-10	Sandy clay loam, clay loam, loam.	SC, CL	A-4, A-6, A-7	0	100	100	90-100	40-70	30-45	8-20
	10-15	Sandy clay loam, clay loam, sandy loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-70	30-50	10-30
	15-23	Sandy loam, very fine sandy loam, clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-60	30-50	10-30
	23-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
BrB*:											
Bullock-----	0-4	Fine sandy loam	SM, ML, SM-SC, CL-ML	A-4	0	100	100	90-100	40-65	25-35	NP-10
	4-10	Sandy clay loam, clay loam, loam.	SC, CL	A-4, A-6, A-7	0	100	100	90-100	40-70	30-45	8-20
	10-15	Sandy clay loam, clay loam, sandy loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-70	30-50	10-30
	15-23	Sandy loam, very fine sandy loam, clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-60	30-50	10-30
	23-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Parchin-----	0-6	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-4	0	100	100	90-100	35-60	20-30	NP-7
	6-10	Fine sandy loam, loamy fine sand, very fine sandy loam.	SM, SM-SC, ML, CL-ML	A-2, A-4	0	100	100	90-100	30-60	<30	NP-7
	10-17	Sandy clay loam, loam, clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-60	30-50	10-30
	17-24	Fine sandy loam, loam, sandy clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	40-60	30-50	10-30
	24-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
BsB*: Bullock-----	0-4	Fine sandy loam	SM, ML, SM-SC, CL-ML	A-4	0	100	100	90-100	40-65	25-35	NP-10
	4-10	Sandy clay loam, clay loam, loam.	SC, CL	A-4, A-6, A-7	0	100	100	90-100	40-70	30-45	8-20
	10-15	Sandy clay loam, clay loam, sandy loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-70	30-50	10-30
	15-23	Sandy loam, very fine sandy loam, clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-60	30-50	10-30
	23-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Parchin-----	0-6	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-4	0	100	100	90-100	35-60	20-30	NP-7
	6-10	Fine sandy loam, loamy fine sand, very fine sandy loam.	SM, SM-SC, ML, CL-ML	A-2, A-4	0	100	100	90-100	30-60	<30	NP-7
	10-17	Sandy clay loam, loam, clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-60	30-50	10-30
	17-24	Fine sandy loam, loam, sandy clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	40-60	30-50	10-30
	24-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Slickspots.											
BvB*: Bullock-----	0-4	Fine sandy loam	SM, ML, SM-SC, CL-ML	A-4	0	100	100	90-100	40-65	25-35	NP-10
	4-10	Sandy clay loam, clay loam, loam.	SC, CL	A-4, A-6, A-7	0	100	100	90-100	40-70	30-45	8-20
	10-15	Sandy clay loam, clay loam, sandy loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-70	30-50	10-30
	15-23	Sandy loam, very fine sandy loam, clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-60	30-50	10-30
	23-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Slickspots.											
BvE*: Bullock-----	0-4	Fine sandy loam	SM, ML, SM-SC, CL-ML	A-4	0	100	100	90-100	40-65	25-35	NP-10
	4-10	Sandy clay loam, clay loam, loam.	SC, CL	A-4, A-6, A-7	0	100	100	90-100	40-70	30-45	8-20
	10-15	Sandy clay loam, clay loam, sandy loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-70	30-50	10-30
	15-23	Sandy loam, very fine sandy loam, clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-60	30-50	10-30
	23-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
BvE*: Slickspots.											
Rock outcrop.											
BzB*: Bullock-----	0-4	Fine sandy loam	SM, ML, SM-SC, CL-ML	A-4	0	100	100	90-100	40-65	25-35	NP-10
	4-10	Sandy clay loam, clay loam, loam.	SC, CL	A-4, A-6, A-7	0	100	100	90-100	40-70	30-45	8-20
	10-15	Sandy clay loam, clay loam, loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-70	30-50	10-30
	15-23	Sandy loam, very fine sandy loam, clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-60	30-50	10-30
	23-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Telfer-----	0-11	Loamy sand-----	SM	A-2	0	100	100	50-80	15-35	---	NP
	11-60	Fine sand, loamy fine sand, loamy sand.	SM	A-2	0	100	100	50-80	15-35	---	NP
Parchin-----	0-6	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-4	0	100	100	90-100	35-60	20-30	NP-7
	6-10	Fine sandy loam, loamy fine sand, very fine sandy loam.	SM, SM-SC, ML, CL-ML	A-2, A-4	0	100	100	90-100	30-60	<30	NP-7
	10-17	Sandy clay loam, loam, clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-60	30-50	10-30
	17-24	Fine sandy loam, loam, sandy clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	40-60	30-50	10-30
	24-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
CaF*: Cabba-----	0-4	Loam-----	CL-ML, CL	A-4, A-6	0	95-100	90-100	70-90	60-85	20-35	5-15
	4-10	Loam, silt loam	CL-ML, CL	A-4, A-6	0-5	90-100	90-100	70-90	60-85	20-35	5-20
	10-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Amor-----	0-7	Loam-----	ML, CL, CL-ML	A-4, A-6	0	100	95-100	90-100	65-85	25-40	3-18
	7-21	Clay loam, loam, fine sandy loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	100	95-100	75-100	50-95	20-45	2-25
	21-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
CbD*: Cabba-----	0-4	Loam-----	CL-ML, CL	A-4, A-6	0	95-100	90-100	70-90	60-85	20-35	5-15
	4-10	Loam, silt loam	CL-ML, CL	A-4, A-6	0-5	90-100	90-100	70-90	60-85	20-35	5-20
	10-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct						
CbD*: Reeder-----	0-6	Loam-----	CL, CL-ML	A-4, A-6	0	100	100	90-100	65-85	20-40	5-20
	6-34	Clay loam, loam, sandy clay loam.	CL, CL-ML	A-4, A-6, A-7	0	100	100	90-100	60-80	25-50	5-30
	34-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
CeE*: Cabba-----	0-4	Loam-----	CL-ML, CL	A-4, A-6	0	95-100	90-100	70-90	60-85	20-35	5-15
	4-10	Loam, silt loam	CL-ML, CL	A-4, A-6	0-5	90-100	90-100	70-90	60-85	20-35	5-20
	10-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Shambo-----	0-7	Loam-----	ML, CL, CL-ML	A-4, A-6	0	100	100	85-95	60-75	25-35	3-13
	7-43	Loam, silt loam, clay loam.	ML, CL, CL-ML	A-4, A-6	0	100	100	85-95	60-75	25-40	3-18
	43-60	Stratified loam to silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	100	100	85-95	60-75	25-40	3-18
CgF*: Cohagen-----	0-16	Fine sandy loam	SM	A-2, A-4	0	100	95-100	60-85	30-50	---	NP
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Cabba-----	0-4	Loam-----	CL-ML, CL	A-4, A-6	0	95-100	90-100	70-90	60-85	20-35	5-15
	4-10	Loam, silt loam	CL-ML, CL	A-4, A-6	0-5	90-100	90-100	70-90	60-85	20-35	5-20
	10-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
CvD*: Cohagen-----	0-16	Fine sandy loam	SM	A-2, A-4	0	100	95-100	60-85	30-50	---	NP
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Vebar-----	0-7	Fine sandy loam	SM, ML	A-4, A-2	0	95-100	90-100	60-100	30-55	---	NP
	7-30	Fine sandy loam, loamy fine sand, sandy loam.	SM, ML	A-4, A-2	0	95-100	90-100	60-100	30-55	---	NP
	30-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
DaA----- Daglum	0-7	Loam-----	SM, ML, CL-ML, SM-SC	A-4	0	100	100	75-90	45-65	20-30	3-10
	7-25	Clay, silty clay, silty clay loam.	CL, CH	A-7, A-6	0	100	100	90-100	70-95	35-75	15-45
	25-60	Clay, silty clay, clay loam.	CL	A-7, A-6	0	100	100	90-100	65-95	35-50	20-30
DuD*: Dupree-----	0-3	Clay-----	CH	A-7	0	100	100	95-100	85-100	60-100	35-70
	3-15	Clay-----	CH	A-7	0	95-100	95-100	90-100	85-100	65-100	30-65
	15-60	Weathered bedrock	CH	A-7	0	100	95-100	95-100	85-100	65-100	30-65
Rock outcrop.											

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
EkA----- Ekalaka	0-19	Very fine sandy loam.	SM, ML	A-2, A-4	0	100	100	70-85	30-60	20-35	NP-10
	19-26	Fine sandy loam, sandy loam, loamy fine sand.	SM, ML, CL-ML, SM-SC	A-2, A-4	0	100	100	70-100	30-70	20-35	NP-10
	26-45	Fine sandy loam, loamy fine sand, fine sand.	SM, SC, SM-SC	A-2, A-4, A-6	0	100	100	50-100	30-40	20-40	NP-15
	45-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
EpB*: Ekalaka-----	0-19	Very fine sandy loam.	SM, ML	A-2, A-4	0	100	100	70-85	30-60	20-35	NP-10
	19-26	Fine sandy loam, sandy loam, loamy fine sand.	SM, ML, CL-ML, SM-SC	A-2, A-4	0	100	100	70-100	30-70	20-35	NP-10
	26-45	Fine sandy loam, loamy fine sand, fine sand.	SM, SC, SM-SC	A-2, A-4, A-6	0	100	100	50-100	30-40	20-40	NP-15
	45-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Parshall-----	0-11	Fine sandy loam	SM, ML	A-4, A-2	0	100	100	60-85	30-55	---	NP
	11-60	Fine sandy loam, sandy loam, loamy sand.	SM, ML	A-4, A-2	0	100	100	60-100	25-55	---	NP
EvB----- Evridge	0-7	Fine sandy loam	CL, SC, CL-ML, SM-SC	A-4	0	100	100	80-95	40-60	20-30	5-10
	7-23	Loamy fine sand, fine sandy loam.	SM, SM-SC, ML	A-2, A-4	0	100	100	80-95	25-55	<30	NP-7
	23-28	Fine sandy loam, sandy loam, loam.	CL, SM-SC, SC, CL-ML	A-4, A-6	0	100	100	75-95	40-60	25-40	5-15
	28-38	Fine sandy loam, sandy loam, loam.	SM, SM-SC, ML, CL-ML	A-4	0-5	90-100	70-100	60-80	40-60	25-35	5-10
	38-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
EwB*: Evridge-----	0-7	Fine sandy loam	CL, SC, CL-ML, SM-SC	A-4	0	100	100	80-95	40-60	20-30	5-10
	7-23	Loamy fine sand, fine sandy loam.	SM, SM-SC, ML	A-2, A-4	0	100	100	80-95	25-55	<30	NP-7
	23-28	Fine sandy loam, sandy loam, loam.	CL, SM-SC, SC, CL-ML	A-4, A-6	0	100	100	75-95	40-60	25-40	5-15
	28-38	Fine sandy loam, sandy loam, loam.	SM, SM-SC, ML, CL-ML	A-4	0-5	90-100	70-100	60-80	40-60	25-35	5-10
	38-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
EwB*: Bullock-----	0-4	Fine sandy loam	SM, ML, SM-SC, CL-ML	A-4	0	100	100	90-100	40-65	25-35	NP-10
	4-10	Sandy clay loam, clay loam, loam.	SC, CL	A-4, A-6, A-7	0	100	100	90-100	40-70	30-45	8-20
	10-15	Sandy clay loam, clay loam, sandy loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-70	30-50	10-30
	15-23	Sandy loam, very fine sandy loam, clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-60	30-50	10-30
	23-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
ExB*: Evridge-----	0-7	Fine sandy loam	CL, SC, CL-ML, SM-SC	A-4	0	100	100	80-95	40-60	20-30	5-10
	7-23	Loamy fine sand, fine sandy loam.	SM, SM-SC, ML	A-2, A-4	0	100	100	80-95	25-55	<30	NP-7
	23-28	Fine sandy loam, sandy loam, loam.	CL, SM-SC, SC, CL-ML	A-4, A-6	0	100	100	75-95	40-60	25-40	5-15
	28-38	Fine sandy loam, sandy loam, loam.	SM, SM-SC, ML, CL-ML	A-4	0-5	90-100	70-100	60-80	40-60	25-35	5-10
	38-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Parchin -----	0-6	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-4	0	100	100	90-100	35-60	20-30	NP-7
	6-10	Fine sandy loam, loamy fine sand, very fine sandy loam.	SM, SM-SC, ML, CL-ML	A-2, A-4	0	100	100	90-100	30-60	<30	NP-7
	10-17	Sandy clay loam, loam, clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-60	30-50	10-30
	17-24	Fine sandy loam, loam, sandy clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	40-60	30-50	10-30
	24-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
FaA, FaB ----- Farnuf	0-5	Loam-----	CL-ML, CL	A-4, A-6	0	100	100	85-95	65-80	25-40	5-20
	5-14	Loam, clay loam	CL	A-6, A-7	0	100	100	80-95	70-85	35-50	15-25
	14-41	Loam, clay loam, silty clay loam.	CL	A-6, A-7	0	100	100	80-95	70-95	35-50	15-25
	41-60	Loam, clay loam, silty clay loam.	CL, CL-ML	A-6, A-7, A-2	0	100	100	75-95	70-95	25-50	5-25
FrF*: Flasher-----	0-4	Fine sandy loam	SM	A-2, A-4	0-5	85-100	85-100	60-100	30-50	---	NP
	4-9	Loamy sand, loamy fine sand, fine sand.	SM	A-2	0-5	85-100	85-100	50-100	15-35	---	NP
	9-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
FtF*:											
Flasher-----	0-4	Fine sandy loam	SM	A-2, A-4	0-5	85-100	85-100	60-100	30-50	---	NP
	4-9	Loamy sand, loamy fine sand, fine sand.	SM	A-2	0-5	85-100	85-100	50-100	15-35	---	NP
	9-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Telfer-----	0-11	Loamy sand-----	SM	A-2	0	100	100	50-80	15-35	---	NP
	11-60	Fine sand, loamy fine sand, loamy sand.	SM	A-2	0	100	100	50-80	15-35	---	NP
Ge-----											
Glenross	0-1	Fine sandy loam	SM, SM-SC	A-4	0	100	100	80-95	35-50	20-30	NP-7
	1-37	Sandy clay loam, fine sandy loam, clay loam.	SC, CL	A-4, A-6	0	100	100	80-90	35-55	25-40	8-20
	37-60	Loamy fine sand, fine sandy loam.	SM, SM-SC	A-2	0	100	100	60-75	15-35	<20	NP-5
Gk*:											
Glenross-----	0-1	Fine sandy loam	SM, SM-SC	A-4	0	100	100	80-95	35-50	20-30	NP-7
	1-37	Sandy clay loam, fine sandy loam, clay loam.	SC, CL	A-4, A-6	0	100	100	80-90	35-55	25-40	8-20
	37-60	Loamy fine sand, fine sandy loam.	SM, SM-SC	A-2	0	100	100	60-75	15-35	<20	NP-5
Ekalaka-----	0-19	Very fine sandy loam.	SM, ML	A-2, A-4	0	100	100	70-85	30-60	20-35	NP-10
	19-26	Fine sandy loam, sandy loam, loamy fine sand.	SM, ML, CL-ML, SM-SC	A-2, A-4	0	100	100	70-100	30-70	20-35	NP-10
	26-45	Fine sandy loam, loamy fine sand, fine sand.	SM, SC, SM-SC	A-2, A-4, A-6	0	100	100	50-100	30-40	20-40	NP-15
	45-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Gr-----											
Grail	0-8	Silty clay loam	CL	A-6, A-7	0	100	95-100	95-100	85-95	30-50	10-30
	8-39	Silty clay, silty clay loam, clay.	CL, CH, ML	A-7, A-6	0	100	95-100	95-100	70-95	35-60	10-35
	39-60	Loam, silty clay loam, clay.	CL, CH	A-6, A-7	0	100	95-100	85-100	60-95	30-55	10-35
Gs-----											
Grassna	0-17	Silt loam-----	ML, CL, CL-ML	A-4, A-6, A-7	0	100	100	90-100	70-100	20-45	3-25
	17-60	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	100	100	90-100	70-100	25-45	3-23
Hd-----											
Harriet	0-3	Loam-----	CL, CL-ML	A-4, A-6	0	100	100	85-100	60-90	25-40	5-20
	3-40	Clay loam, clay, silty clay.	CL, CH	A-7, A-6	0	100	100	90-100	70-100	35-70	20-40
	40-60	Stratified very fine sandy loam to silty clay.	CL, CL-ML, CH	A-4, A-6, A-7	0	100	100	90-100	60-100	20-65	5-40

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		#	10	40	200		
	In				Pct					Pct	
Hf, Hg, Hn----- Havrelon	0-4	Loam-----	ML, CL, CL-ML	A-4, A-6, A-7	0	100	100	85-100	60-95	20-45	3-28
	4-60	Stratified silty clay loam to very fine sandy loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	100	100	85-100	60-80	20-45	3-28
HrA*: Havrelon-----	0-4	Loam-----	ML, CL, CL-ML	A-4, A-6, A-7	0	100	100	85-100	60-95	20-45	3-28
	4-60	Stratified silty clay loam to very fine sandy loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	100	100	85-100	60-80	20-45	3-28
Rhoades-----	0-3	Loam-----	SM, ML, SC, CL	A-4, A-6	0	100	100	75-90	45-65	20-35	NP-15
	3-25	Clay loam, silty clay, clay.	CL, CH	A-7	0	100	100	90-100	80-95	40-75	20-45
	25-60	Silty clay, clay loam, loam.	CL, CH	A-6, A-7	0	100	100	85-100	75-95	35-70	20-40
Hs----- Heil	0-2	Silt loam-----	CL	A-6, A-7	0	100	100	90-100	70-100	25-45	10-25
	2-18	Silty clay, clay, silty clay loam.	CH	A-7	0	100	100	90-100	75-100	50-75	25-45
	18-60	Silty clay, clay, clay loam.	CH, CL	A-7, A-6	0	100	100	85-100	60-100	25-75	11-45
HuB----- Hurley	0-2	Silt loam-----	CL, CL-ML	A-4, A-6	0	100	100	95-100	90-100	25-40	5-15
	2-30	Clay, shaly clay	CH, MH	A-7	0	100	100	85-100	80-100	60-90	30-50
	30-60	Weathered bedrock	CH, MH	A-7	0	100	100	95-100	80-100	50-100	20-65
HwA*: Hurley-----	0-2	Silt loam-----	CL, CL-ML	A-4, A-6	0	100	100	95-100	90-100	25-40	5-15
	2-30	Clay, shaly clay	CH, MH	A-7	0	100	100	85-100	80-100	60-90	30-50
	30-60	Weathered bedrock	CH, MH	A-7	0	100	100	95-100	80-100	50-100	20-65
Slickspots.											
Ka----- Korchea	0-9	Loam-----	CL, CL-ML	A-4, A-6	0	100	100	75-95	50-70	15-30	5-15
	9-60	Stratified fine sandy loam to silty clay loam.	SM-SC, CL-ML, CL, SC	A-4, A-6, A-7	0	100	100	70-100	40-95	20-50	5-20
Kc----- Korchea	0-9	Loam-----	CL, CL-ML	A-4, A-6	0	100	100	75-95	50-70	15-30	5-15
	9-60	Stratified fine sandy loam to silty clay loam.	SM-SC, CL-ML, CL, SC	A-4, A-6, A-7	0	100	100	70-100	40-80	20-50	5-20
La----- Lallie	0-2	Silty clay loam	CL	A-6, A-7	0	100	100	85-100	60-95	25-50	10-25
	2-60	Silty clay loam, silty clay, clay.	CL, CH	A-7	0	100	95-100	90-100	85-100	45-95	20-60

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
LeA, LeB----- Lehr	0-6	Loam-----	ML, CL, CL-ML	A-4, A-6	0	95-100	95-100	85-95	60-80	20-40	3-15
	6-17	Loam, clay loam	CL, CL-ML	A-4, A-6	0-5	95-100	95-100	85-95	60-75	25-40	5-15
	17-30	Gravelly coarse sandy loam, gravelly loamy coarse sand.	SM, SP-SM	A-1	0-5	65-90	50-75	30-50	5-15	---	NP
	30-60	Gravelly loamy sand, very gravelly sand, very gravelly coarse sand.	SM, SP, GM, GP	A-1	0-5	40-70	25-50	10-35	2-15	---	NP
Mc----- McKenzie	0-3	Clay-----	CH	A-7	0	100	100	90-100	75-95	50-75	25-50
	3-23	Clay, silty clay	CH	A-7	0	100	100	95-100	75-95	50-75	25-50
	23-60	Clay, silty clay	CH	A-7	0	100	100	95-100	75-95	50-75	25-50
OaB, OaC----- Opal	0-4	Clay-----	CH, MH	A-7	0	100	100	90-100	80-100	60-80	25-45
	4-22	Clay-----	CH, MH	A-7	0	100	100	90-100	80-100	65-85	30-50
	22-36	Clay, shaly clay, very shaly clay.	CH, MH	A-7	0	100	95-100	90-100	80-100	65-85	30-50
	36-60	Weathered bedrock	CH, MH	A-7	0	100	95-100	90-100	85-100	60-95	25-60
OdC*: Opal	0-4	Clay-----	CH, MH	A-7	0	100	100	90-100	80-100	60-80	25-45
	4-22	Clay-----	CH, MH	A-7	0	100	100	90-100	80-100	65-85	30-50
	22-36	Clay, shaly clay, very shaly clay.	CH, MH	A-7	0	100	95-100	90-100	80-100	65-85	30-50
	36-60	Weathered bedrock	CH, MH	A-7	0	100	95-100	90-100	85-100	60-95	25-60
Dupree-----	0-3	Clay-----	CH	A-7	0	100	100	95-100	85-100	60-100	35-70
	3-15	Clay-----	CH	A-7	0	95-100	95-100	90-100	85-100	65-100	30-65
	15-60	Weathered bedrock	CH	A-7	0	100	95-100	95-100	85-100	65-100	30-65
OhB*: Opal	0-4	Clay-----	CH, MH	A-7	0	100	100	90-100	80-100	60-80	25-45
	4-22	Clay-----	CH, MH	A-7	0	100	100	90-100	80-100	65-85	30-50
	22-36	Clay, shaly clay, very shaly clay.	CH, MH	A-7	0	100	95-100	90-100	80-100	65-85	30-50
	36-60	Weathered bedrock	CH, MH	A-7	0	100	95-100	90-100	85-100	60-95	25-60
Hurley-----	0-2	Silt loam-----	CL, CL-ML	A-4, A-6	0	100	100	95-100	90-100	25-40	5-15
	2-30	Clay, shaly clay	CH, MH	A-7	0	100	100	85-100	80-100	60-90	30-50
	30-60	Weathered bedrock	CH, MH	A-7	0	100	100	95-100	80-100	50-100	20-65
OsC*: Opal	0-4	Clay-----	CH, MH	A-7	0	100	100	90-100	80-100	60-80	25-45
	4-22	Clay-----	CH, MH	A-7	0	100	100	90-100	80-100	65-85	30-50
	22-36	Clay, shaly clay, very shaly clay.	CH, MH	A-7	0	100	95-100	90-100	80-100	65-85	30-50
	36-60	Weathered bedrock	CH, MH	A-7	0	100	95-100	90-100	85-100	60-95	25-60
Sansarc-----	0-4	Clay-----	CH, MH	A-7	0	100	95-100	90-100	75-100	60-90	25-55
	4-16	Clay-----	CH, MH	A-7	0	80-100	75-100	75-100	75-100	60-90	25-55
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
PaB----- Parchin	0-6	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-4	0	100	100	90-100	35-60	20-30	NP-7
	6-10	Fine sandy loam, loamy fine sand, very fine sandy loam.	SM, SM-SC, ML, CL-ML	A-2, A-4	0	100	100	90-100	30-60	<30	NP-7
	10-17	Sandy clay loam, loam, clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-60	30-50	10-30
	17-24	Fine sandy loam, loam, sandy clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	40-60	30-50	10-30
	24-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
PdD*: Parchin-----	0-6	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-4	0	100	100	90-100	35-60	20-30	NP-7
	6-10	Fine sandy loam, loamy fine sand, very fine sandy loam.	SM, SM-SC, ML, CL-ML	A-2, A-4	0	100	100	90-100	30-60	<30	NP-7
	10-17	Sandy clay loam, loam, clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-60	30-50	10-30
	17-24	Fine sandy loam, loam, sandy clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	40-60	30-50	10-30
	24-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Bullock-----	0-4	Fine sandy loam	SM, ML, SM-SC, CL-ML	A-4	0	100	100	90-100	40-65	25-35	NP-10
	4-10	Sandy clay loam, clay loam, loam.	SC, CL	A-4, A-6, A-7	0	100	100	90-100	40-70	30-45	8-20
	10-15	Sandy clay loam, clay loam, sandy loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-70	30-50	10-30
	15-23	Sandy loam, very fine sandy loam, clay loam.	SC, CL	A-6, A-7	0	100	95-100	90-100	35-60	30-50	10-30
	23-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Cabba-----	0-4	Loam-----	CL-ML, CL	A-4, A-6	0	95-100	90-100	70-90	60-85	20-35	5-15
	4-10	Loam, silt loam	CL-ML, CL	A-4, A-6	0-5	90-100	90-100	70-90	60-85	20-35	5-20
	10-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
PeA----- Parshall	0-11	Fine sandy loam	SM, ML	A-4, A-2	0	100	100	60-85	30-55	---	NP
	11-60	Fine sandy loam, sandy loam, loamy sand.	SM, ML	A-4, A-2	0	100	100	60-100	25-55	---	NP
Pg*. Pits											
PrA, PrB----- Promise	0-9	Clay-----	CH, MH	A-7	0	100	100	90-100	80-100	55-70	25-40
	9-34	Clay-----	CH, MH	A-7	0	100	100	90-100	85-100	60-85	25-50
	34-60	Clay, silty clay	CH, MH	A-7	0	100	100	90-100	85-100	60-90	25-55

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
RaA, RaB, RaC--- Reeder	0-6	Loam-----	CL, CL-ML	A-4, A-6	0	100	100	90-100	65-85	20-40	5-20
	6-34	Clay loam, loam, sandy clay loam.	CL, CL-ML	A-4, A-6, A-7	0	100	100	90-100	60-80	25-50	5-30
	34-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
RcB*, RcC*: Reeder-----	0-6	Loam-----	CL, CL-ML	A-4, A-6	0	100	100	90-100	65-85	20-40	5-20
	6-34	Clay loam, loam, sandy clay loam.	CL, CL-ML	A-4, A-6, A-7	0	100	100	90-100	60-80	25-50	5-30
	34-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Cabba-----	0-4	Loam-----	CL-ML, CL	A-4, A-6	0	95-100	90-100	70-90	60-85	20-35	5-15
	4-10	Loam, silt loam	CL-ML, CL	A-4, A-6	0-5	90-100	90-100	70-90	60-85	20-35	5-20
	10-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
RhB*: Reeder-----	0-6	Loam-----	CL, CL-ML	A-4, A-6	0	100	100	90-100	65-85	20-40	5-20
	6-34	Clay loam, loam, sandy clay loam.	CL, CL-ML	A-4, A-6, A-7	0	100	100	90-100	60-80	25-50	5-30
	34-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rhoades-----	0-3	Loam-----	SM, ML, SC, CL	A-4, A-6	0	100	100	75-90	45-65	20-35	NP-15
	3-25	Clay loam, silty clay, clay.	CL, CH	A-7	0	100	100	90-100	80-95	40-75	20-45
	25-49	Silty clay, clay loam, loam.	CL, CH	A-6, A-7	0	100	100	85-100	75-95	35-70	20-40
	49-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
RnA, RnB----- Regent	0-6	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	80-100	30-50	15-30
	6-33	Silty clay loam, silty clay.	CL, CH	A-7	0	100	100	90-100	80-100	40-70	15-45
	33-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
RpC*: Regent-----	0-6	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	80-100	30-50	15-30
	6-33	Silty clay loam, silty clay.	CL, CH	A-7	0	100	100	90-100	80-100	40-70	15-45
	33-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Wayden-----	0-5	Silty clay loam	CL, CH	A-6, A-7	0	100	100	90-100	70-95	35-60	15-30
	5-18	Silty clay, clay, silty clay loam.	CH, CL	A-7	0	100	100	90-100	75-95	40-60	15-30
	18-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
RrA----- Rhoades	0-3	Loam-----	SM, ML, SC, CL	A-4, A-6	0	100	100	75-90	45-65	20-35	NP-15
	3-25	Clay loam, silty clay, clay.	CL, CH	A-7	0	100	100	90-100	80-95	40-75	20-45
	25-49	Silty clay, clay loam, loam.	CL, CH	A-6, A-7	0	100	100	85-100	75-95	35-70	20-40
	49-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
RsB*:											
Rhoades-----	0-3	Loam-----	SM, ML, SC, CL	A-4, A-6	0	100	100	75-90	45-65	20-35	NP-15
	3-25	Clay loam, silty clay, clay.	CL, CH	A-7	0	100	100	90-100	80-95	40-75	20-45
	25-49	Silty clay, clay loam, loam.	CL, CH	A-6, A-7	0	100	100	85-100	75-95	35-70	20-40
	49-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Daglum-----	0-7	Loam-----	SM, ML, CL-ML, SM-SC	A-4	0	100	100	75-90	45-65	20-30	3-10
	7-25	Clay, silty clay, silty clay loam.	CL, CH	A-7, A-6	0	100	100	90-100	70-95	35-75	15-45
	25-60	Clay, silty clay, clay loam.	CL	A-7, A-6	0	100	100	90-100	65-95	35-50	20-30
RtB*:											
Rhoades-----	0-3	Loam-----	SM, ML, SC, CL	A-4, A-6	0	100	100	75-90	45-65	20-35	NP-15
	3-25	Clay loam, silty clay, clay.	CL, CH	A-7	0	100	100	90-100	80-95	40-75	20-45
	25-49	Silty clay, clay loam, loam.	CL, CH	A-6, A-7	0	100	100	85-100	75-95	35-70	20-40
	49-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Daglum-----	0-7	Loam-----	SM, ML, CL-ML, SM-SC	A-4	0	100	100	75-90	45-65	20-30	3-10
	7-25	Clay, silty clay, silty clay loam.	CL, CH	A-7, A-6	0	100	100	90-100	70-95	35-75	15-45
	25-60	Clay, silty clay, clay loam.	CL	A-7, A-6	0	100	100	90-100	65-95	35-50	20-30
Slickspots.											
RuB*:											
Rhoades-----	0-3	Loam-----	SM, ML, SC, CL	A-4, A-6	0	100	100	75-90	45-65	20-35	NP-15
	3-25	Clay loam, silty clay, clay.	CL, CH	A-7	0	100	100	90-100	80-95	40-75	20-45
	25-49	Silty clay, clay loam, loam.	CL, CH	A-6, A-7	0	100	100	85-100	75-95	35-70	20-40
	49-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Slickspots.											
RvE*:											
Rhoades-----	0-3	Loam-----	SM, ML, SC, CL	A-4, A-6	0	100	100	75-90	45-65	20-35	NP-15
	3-25	Clay loam, silty clay, clay.	CL, CH	A-7	0	100	100	90-100	80-95	40-75	20-45
	25-49	Silty clay, clay loam, loam.	CL, CH	A-6, A-7	0	100	100	85-100	75-95	35-70	20-40
	49-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Slickspots.											
Rock outcrop.											

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
RzF*: Rock outcrop.											
Cabba-----	0-4	Loam-----	CL-ML, CL	A-4, A-6	0	95-100	90-100	70-90	60-85	20-35	5-15
	4-10	Loam, silt loam	CL-ML, CL	A-4, A-6	0-5	90-100	90-100	70-90	60-85	20-35	5-20
	10-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
SbE*:											
Sansarc-----	0-4	Clay-----	CH, MH	A-7	0	100	95-100	90-100	75-100	60-90	25-55
	4-16	Clay-----	CH, MH	A-7	0	80-100	75-100	75-100	75-100	60-90	25-55
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Opal-----	0-4	Clay-----	CH, MH	A-7	0	100	100	90-100	80-100	60-80	25-45
	4-22	Clay-----	CH, MH	A-7	0	100	100	90-100	80-100	65-85	30-50
	22-36	Clay, shaly clay, very shaly clay.	CH, MH	A-7	0	100	95-100	90-100	80-100	65-85	30-50
	36-60	Weathered bedrock	CH, MH	A-7	0	100	95-100	90-100	85-100	60-95	25-60
SdD*:											
Sansarc-----	0-4	Clay-----	CH, MH	A-7	0	100	95-100	90-100	75-100	60-90	25-55
	4-16	Clay-----	CH, MH	A-7	0	80-100	75-100	75-100	75-100	60-90	25-55
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Opal-----	0-4	Clay-----	CH, MH	A-7	0	100	100	90-100	80-100	60-80	25-45
	4-22	Clay-----	CH, MH	A-7	0	100	100	90-100	80-100	65-85	30-50
	22-36	Clay, shaly clay, very shaly clay.	CH, MH	A-7	0	100	95-100	90-100	80-100	65-85	30-50
	36-60	Weathered bedrock	CH, MH	A-7	0	100	95-100	90-100	85-100	60-95	25-60
Dupree-----	0-3	Clay-----	CH	A-7	0	100	100	95-100	85-100	60-100	35-70
	3-15	Clay-----	CH	A-7	0	95-100	95-100	90-100	85-100	65-100	30-65
	15-60	Weathered bedrock	CH	A-7	0	100	95-100	95-100	85-100	65-100	30-65
SeE*:											
Sansarc-----	0-4	Clay-----	CH, MH	A-7	0	100	95-100	90-100	75-100	60-90	25-55
	4-16	Clay-----	CH, MH	A-7	0	80-100	75-100	75-100	75-100	60-90	25-55
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Wabek-----	0-8	Gravelly sandy loam.	SM	A-2, A-4	0-1	85-100	85-100	60-70	30-40	---	NP
	8-60	Sand and gravel	GM, GP, SM, SP	A-1	0-1	25-75	10-60	5-35	0-25	---	NP
SgA, SgB-----	0-7	Silt loam-----	CL	A-6	0	100	100	90-100	70-80	20-40	10-20
Savage	7-21	Silty clay, clay, silty clay loam.	CL, CH	A-7	0	100	100	95-100	85-95	40-70	20-45
	21-29	Silty clay, clay, silty clay loam.	CL, CH	A-7	0	100	100	95-100	85-95	40-70	20-45
	29-60	Silty clay loam, silty clay, clay.	CL, CH	A-7	0	100	100	95-100	85-95	40-70	20-45
ShA, ShB, ShC-----	0-7	Loam-----	ML, CL, CL-ML	A-4, A-6	0	100	100	85-95	60-75	25-35	3-13
Shambo	7-43	Loam, silt loam, clay loam.	ML, CL, CL-ML	A-4, A-6	0	100	100	85-95	60-75	25-40	3-18
	43-60	Stratified loam to silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	100	100	85-95	60-75	25-40	3-18

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
StA, StB----- Stady	0-5	Loam-----	ML, CL	A-4, A-6	0-1	95-100	95-100	85-95	60-75	25-40	3-15
	5-15	Loam-----	ML, CL	A-4, A-6	0-1	95-100	95-100	85-95	60-75	25-40	3-15
	15-23	Loam, gravelly loam.	ML, CL	A-4, A-6	0-1	80-100	80-100	75-95	55-75	25-40	3-15
	23-60	Sand and gravel	SM, SP, GM, GP	A-1	0-1	50-100	50-95	10-30	2-15	---	NP
TaA----- Tally	0-7	Fine sandy loam	SM, ML, SM-SC, CL-ML	A-4, A-2	0	90-100	80-100	60-100	30-55	20-30	NP-10
	7-29	Fine sandy loam, sandy loam.	SM, SM-SC	A-4, A-2	0	90-100	80-100	60-100	25-50	15-25	NP-10
	29-60	Sandy loam, fine sand, loamy fine sand.	SM	A-4, A-2	0	90-100	80-100	60-100	15-50	15-25	NP-5
TdA----- Telfer	0-11	Loamy sand-----	SM	A-2	0	100	100	50-80	15-35	---	NP
	11-60	Fine sand, loamy fine sand, loamy sand.	SM	A-2	0	100	100	50-80	15-35	---	NP
TeB*: Telfer-----	0-11	Loamy sand-----	SM	A-2	0	100	100	50-80	15-35	---	NP
	11-60	Fine sand, loamy fine sand, loamy sand.	SM	A-2	0	100	100	50-80	15-35	---	NP
Ekalaka-----	0-19	Very fine sandy loam.	SM, ML	A-2, A-4	0	100	100	70-85	30-60	20-35	NP-10
	19-26	Fine sandy loam, sandy loam, loamy fine sand.	SM, ML, CL-ML, SM-SC	A-2, A-4	0	100	100	70-100	30-70	20-35	NP-10
	26-45	Fine sandy loam, loamy fine sand, fine sand.	SM, SC, SM-SC	A-2, A-4, A-6	0	100	100	50-100	30-40	20-40	NP-15
	45-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Th----- Trembles	0-9	Fine sandy loam	SM, ML	A-4	0	100	100	75-85	45-55	20-30	NP-5
	9-39	Stratified fine sandy loam to loam.	SM, ML	A-4	0	100	100	65-85	30-55	20-30	NP-5
	39-60	Stratified fine sandy loam to loam.	SM	A-4, A-2	0	100	100	60-80	25-50	15-25	NP-5
Tm----- Trembles	0-9	Fine sandy loam	SM, ML	A-4	0	100	100	75-85	45-55	20-30	NP-5
	9-39	Stratified fine sandy loam to loam.	SM, ML	A-2, A-4	0	100	100	65-85	30-55	20-30	NP-5
	39-60	Stratified fine sandy loam to loamy sand.	SM	A-2, A-4	0	100	100	60-80	25-50	15-25	NP-5
Tt----- Trembles	0-9	Fine sandy loam	SM, ML	A-4	0	100	100	70-85	40-55	20-30	NP-5
	9-39	Stratified fine sandy loam to loam.	SM, ML	A-4	0	100	100	65-85	35-60	20-30	NP-5
	39-60	Stratified fine sandy loam to loamy sand.	SM	A-4, A-2	0	100	100	60-80	25-50	15-25	NP-5

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
VeA, VeB----- Vebar	0-7	Fine sandy loam	SM, ML	A-4, A-2	0	95-100	90-100	60-100	30-55	---	NP
	7-30	Fine sandy loam, loamy fine sand, sandy loam.	SM, ML	A-4, A-2	0	95-100	90-100	60-100	30-55	---	NP
	30-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
VhB*: Vebar-----	0-7	Fine sandy loam	SM, ML	A-4, A-2	0	95-100	90-100	60-100	30-55	---	NP
	7-30	Fine sandy loam, loamy fine sand, sandy loam.	SM, ML	A-4, A-2	0	95-100	90-100	60-100	30-55	---	NP
	30-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Cohagen-----	0-16	Fine sandy loam	SM	A-2, A-4	0	100	95-100	60-85	30-50	---	NP
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
WaD----- Wabek	0-8	Gravelly sandy loam.	SM	A-2, A-4	0-1	85-100	85-100	60-70	30-40	---	NP
	8-60	Sand and gravel	GM, GP, SM, SP	A-1	0-1	25-75	10-60	5-35	0-25	---	NP
WcE*: Wayden-----	0-5	Silty clay loam	CL, CH	A-6, A-7	0	100	100	90-100	70-95	35-60	15-30
	5-18	Silty clay, clay, silty clay loam.	CH, CL	A-7	0	100	100	90-100	75-95	40-60	15-30
	18-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Cabba-----	0-4	Loam-----	CL-ML, CL	A-4, A-6	0	95-100	90-100	70-90	60-85	20-35	5-15
	4-10	Loam, silt loam	CL-ML, CL	A-4, A-6	0-5	90-100	90-100	70-90	60-85	20-35	5-20
	10-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
WdE*: Wayden-----	0-5	Silty clay loam	CL, CH	A-6, A-7	0-15	95-100	95-100	90-100	80-100	35-55	15-30
	5-18	Silty clay loam	CL, CH	A-7	0-15	95-100	95-100	90-100	80-100	40-75	20-45
	18-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Cabba-----	0-4	Loam-----	CL-ML, CL	A-4, A-6	0-15	80-100	75-100	60-85	50-75	20-35	5-15
	4-10	Gravelly loam, silt loam, silty clay loam.	CL, CL-ML, SM-SC, GM-GC	A-4, A-6	0-10	60-100	55-100	50-100	45-95	25-35	5-15
	10-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Wt----- Wendte	0-5	Silty clay-----	CH, MH	A-7	0	100	100	90-100	80-100	50-80	20-45
	5-60	Stratified silty clay loam to clay.	CH, MH	A-7	0	100	100	90-100	70-100	50-80	20-45
ZeB----- Zeona	0-4	Loamy fine sand	SM, SP-SM, SM-SC	A-2	0	100	100	80-100	10-35	<25	NP-5
	4-60	Loamy fine sand, fine sand.	SM, SP-SM, SM-SC	A-2	0	100	100	75-95	10-35	<25	NP-5

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
ZsD*: Zeona-----	0-4	Loamy fine sand	SM, SP-SM, SM-SC	A-2	0	100	100	80-100	10-35	<25	NP-5
	4-60	Loamy fine sand, fine sand.	SM, SP-SM, SM-SC	A-2	0	100	100	75-95	10-35	<25	NP-5
Slickspots.											
Rock outcrop.											

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Permeability	Available	Soil	Salinity	Shrink-	Erosion		Wind	Organic
				water	reaction		swell	K	T	erodi-	
	In	Pct	In/hr	In/in	pH	mmhos/cm	potential			bility	matter
										group	Pct
An-----	0-9	15-25	0.6-2.0	0.18-0.22	6.1-7.8	<2	Moderate	0.28	5	6	3-6
Arnegard	9-47	18-30	0.6-2.0	0.17-0.21	6.1-7.8	<2	Moderate	0.28			
	47-60	5-30	0.6-2.0	0.13-0.19	6.6-8.4	<2	Low-----	0.28			
Bb*. Badland											
Bd-----	0-3	0-10	6.0-20	0.06-0.09	6.6-7.8	<2	Low-----	0.15	5	1	<1
Banks	3-60	0-10	6.0-20	0.07-0.09	7.4-8.4	<2	Low-----	0.17			
BeA*: Belfield-----	0-10	27-35	0.2-2.0	0.17-0.22	6.1-7.3	<2	High-----	0.32	3	7	2-6
	10-20	35-45	0.06-0.2	0.14-0.18	6.6-7.8	<2	High-----	0.32			
	20-45	27-45	0.06-0.2	0.13-0.16	7.9-9.0	4-16	High-----	0.32			
	45-60	---	---	---	---	---	-----	---			
Daglum-----	0-7	10-25	0.6-6.0	0.13-0.15	6.1-7.3	<2	Low-----	0.32	3	6	2-4
	7-25	35-60	<0.2	0.12-0.14	6.1-9.0	2-8	High-----	0.32			
	25-60	35-60	<0.2	0.12-0.14	7.9-9.0	8-16	High-----	0.32			
BfA, BfB-----	0-6	18-26	0.6-2.0	0.18-0.20	6.1-7.3	<2	Low-----	0.32	5	6	2-4
Bryant	6-20	22-35	0.6-2.0	0.19-0.22	6.6-7.8	<2	Low-----	0.43			
	20-60	22-35	0.6-2.0	0.17-0.20	7.4-8.4	<2	Low-----	0.43			
BgB*, BgC*: Bryant-----	0-6	18-26	0.6-2.0	0.18-0.20	6.1-7.3	<2	Low-----	0.32	5	6	2-4
	6-20	22-35	0.6-2.0	0.19-0.22	6.6-7.8	<2	Low-----	0.43			
	20-60	22-35	0.6-2.0	0.17-0.20	7.4-8.4	<2	Low-----	0.43			
Sutley-----	0-6	15-18	0.6-2.0	0.19-0.22	6.6-8.4	<2	Low-----	0.32	5	4L	2-4
	6-60	12-18	0.6-2.0	0.15-0.20	7.4-8.4	<2	Low-----	0.43			
BlA-----	0-1	55-65	<0.06	0.10-0.14	6.6-8.4	<2	Very high	0.37	5	4	1-2
Bullcreek	1-10	60-70	<0.06	0.10-0.14	7.4-9.0	<4	Very high	0.37			
	10-19	60-70	<0.06	0.08-0.12	7.4-9.0	4-16	Very high	0.37			
	19-60	60-70	<0.06	0.08-0.12	7.4-9.0	4-16	Very high	0.37			
BmA*: Bullcreek-----	0-1	55-65	<0.06	0.10-0.14	6.6-8.4	<2	Very high	0.37	5	4	1-2
	1-10	60-70	<0.06	0.10-0.14	7.4-9.0	<4	Very high	0.37			
	10-19	60-70	<0.06	0.08-0.12	7.4-9.0	4-16	Very high	0.37			
	19-60	60-70	<0.06	0.08-0.12	7.4-9.0	4-16	Very high	0.37			
Slickspots.											
BnA-----	0-4	5-10	2.0-6.0	0.12-0.17	6.1-7.8	<2	Low-----	0.28	3	3	1-2
Bullock	4-10	18-35	<0.2	0.13-0.17	7.4-8.4	<4	Moderate	0.37			
	10-15	18-35	<0.06	0.07-0.15	7.4-9.0	4-8	Moderate	0.37			
	15-23	10-35	0.06-2.0	0.07-0.15	7.4-9.0	4-8	Moderate	0.37			
	23-60	---	---	---	---	---	-----	---			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors		Wind erodi- bility group	Organic matter
								K	T		
	In	Pct	In/hr	In/in	pH	mmhos/cm					Pct
BrB*:											
Bullock-----	0-4	5-10	2.0-6.0	0.12-0.17	6.1-7.8	<2	Low-----	0.28	3	3	1-2
	4-10	18-35	<0.2	0.13-0.17	7.4-8.4	<4	Moderate	0.37			
	10-15	18-35	<0.06	0.07-0.15	7.4-9.0	4-8	Moderate	0.37			
	15-23	10-35	0.06-2.0	0.07-0.15	7.4-9.0	4-8	Moderate	0.37			
	23-60	---	---	---	---	---	-----	---			
Parchin-----	0-6	5-15	2.0-6.0	0.13-0.16	5.1-7.3	<2	Low-----	0.24	3	3	1-3
	6-10	5-15	2.0-6.0	0.08-0.14	5.6-7.3	<2	Low-----	0.24			
	10-17	18-34	<0.2	0.13-0.15	7.4-9.0	2-8	Moderate	0.37			
	17-24	15-30	0.6-2.0	0.11-0.13	7.4-9.0	2-8	Low-----	0.37			
	24-60	---	---	---	---	---	-----	---			
BsB*:											
Bullock-----	0-4	5-10	2.0-6.0	0.12-0.17	6.1-7.8	<2	Low-----	0.28	3	3	1-2
	4-10	18-35	<0.2	0.13-0.17	7.4-8.4	<4	Moderate	0.37			
	10-15	18-35	<0.06	0.07-0.15	7.4-9.0	4-8	Moderate	0.37			
	15-23	10-35	0.06-2.0	0.07-0.15	7.4-9.0	4-8	Moderate	0.37			
	23-60	---	---	---	---	---	-----	---			
Parchin-----	0-6	5-15	2.0-6.0	0.13-0.16	5.1-7.3	<2	Low-----	0.24	3	3	1-3
	6-10	5-15	2.0-6.0	0.08-0.14	5.6-7.3	<2	Low-----	0.24			
	10-17	18-34	<0.2	0.13-0.15	7.4-9.0	2-8	Moderate	0.37			
	17-24	15-30	0.6-2.0	0.11-0.13	7.4-9.0	2-8	Low-----	0.37			
	24-60	---	---	---	---	---	-----	---			
Slickspots.											
BuB*:											
Bullock-----	0-4	5-10	2.0-6.0	0.12-0.17	6.1-7.8	<2	Low-----	0.28	3	3	1-2
	4-10	18-35	<0.2	0.13-0.17	7.4-8.4	<4	Moderate	0.37			
	10-15	18-35	<0.06	0.07-0.15	7.4-9.0	4-8	Moderate	0.37			
	15-23	10-35	0.06-2.0	0.07-0.15	7.4-9.0	4-8	Moderate	0.37			
	23-60	---	---	---	---	---	-----	---			
Slickspots.											
BvE*:											
Bullock-----	0-4	5-10	2.0-6.0	0.12-0.17	6.1-7.8	<2	Low-----	0.28	3	3	1-2
	4-10	18-35	<0.2	0.13-0.17	7.4-8.4	<4	Moderate	0.37			
	10-15	18-35	<0.06	0.07-0.15	7.4-9.0	4-8	Moderate	0.37			
	15-23	10-35	0.06-2.0	0.07-0.15	7.4-9.0	4-8	Moderate	0.37			
	23-60	---	---	---	---	---	-----	---			
Slickspots.											
Rock outcrop.											
BzB*:											
Bullock-----	0-4	5-10	2.0-6.0	0.12-0.17	6.1-7.8	<2	Low-----	0.28	3	3	1-2
	4-10	18-35	<0.2	0.13-0.17	7.4-8.4	<4	Moderate	0.37			
	10-15	18-35	<0.06	0.07-0.15	7.4-9.0	4-8	Moderate	0.37			
	15-23	10-35	0.06-2.0	0.07-0.15	7.4-9.0	4-8	Moderate	0.37			
	23-60	---	---	---	---	---	-----	---			
Telfer-----	0-11	0-8	6.0-20	0.10-0.12	6.1-7.3	<2	Low-----	0.17	5	2	1-3
	11-60	0-8	6.0-20	0.06-0.10	6.6-7.8	<2	Low-----	0.17			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors		Wind erodi- bility	Organic matter
	In	Pct	In/hr	In/in	pH	mmhos/cm		K	T	group	Pct
BzB*:											
Parchin-----	0-6	5-15	2.0-6.0	0.13-0.16	5.1-7.3	<2	Low-----	0.24	3	3	1-3
	6-10	5-15	2.0-6.0	0.08-0.14	5.6-7.3	<2	Low-----	0.24			
	10-17	18-34	<0.2	0.13-0.15	7.4-9.0	2-8	Moderate	0.37			
	17-24	15-30	0.6-2.0	0.11-0.13	7.4-9.0	2-8	Low-----	0.37			
	24-60	---	---	---	---	---	-----	---			
CaF*:											
Cabba-----	0-4	20-27	0.6-2.0	0.18-0.20	6.6-8.4	<2	Moderate	0.32	2	4L	.5-1
	4-10	20-35	0.6-2.0	0.16-0.18	7.4-8.4	2-8	Moderate	0.32			
	10-60	---	---	---	---	---	-----	---			
Amor-----	0-7	15-25	0.6-2.0	0.20-0.23	6.1-7.3	<2	Moderate	0.28	4	6	3-6
	7-21	18-30	0.6-2.0	0.15-0.18	6.6-8.4	<2	Moderate	0.28			
	21-60	---	---	---	---	---	-----	---			
CbD*:											
Cabba-----	0-4	20-27	0.6-2.0	0.18-0.20	6.6-8.4	<2	Moderate	0.32	2	4L	.5-1
	4-10	20-35	0.6-2.0	0.16-0.18	7.4-8.4	2-8	Moderate	0.32			
	10-60	---	---	---	---	---	-----	---			
Reeder-----	0-6	10-27	0.6-2.0	0.20-0.23	6.1-7.3	<2	Moderate	0.28	4	6	3-5
	6-34	18-35	0.6-2.0	0.15-0.18	6.6-8.4	<2	Moderate	0.28			
	34-60	---	---	---	---	---	-----	---			
CeE*:											
Cabba-----	0-4	20-27	0.6-2.0	0.18-0.20	6.6-8.4	<2	Moderate	0.32	2	4L	.5-1
	4-10	20-35	0.6-2.0	0.16-0.18	7.4-8.4	2-8	Moderate	0.32			
	10-60	---	---	---	---	---	-----	---			
Shambo-----	0-7	10-27	0.6-2.0	0.20-0.22	6.1-7.3	<2	Low-----	0.28	5	6	2-6
	7-43	18-30	0.6-2.0	0.17-0.19	6.6-7.8	<2	Moderate	0.28			
	43-60	18-30	0.6-2.0	0.17-0.19	7.4-9.0	<2	Moderate	0.28			
CgF*:											
Cohagen-----	0-16	10-18	0.6-6.0	0.13-0.18	6.6-8.4	<2	Low-----	0.24	2	3	<1
	16-60	---	---	---	---	---	-----	---			
Cabba-----	0-4	20-27	0.6-2.0	0.18-0.20	6.6-8.4	<2	Moderate	0.32	2	4L	.5-1
	4-10	20-35	0.6-2.0	0.16-0.18	7.4-8.4	2-8	Moderate	0.32			
	10-60	---	---	---	---	---	-----	---			
Rock outcrop.											
CvD*:											
Cohagen-----	0-16	10-18	0.6-6.0	0.13-0.18	6.6-8.4	<2	Low-----	0.24	2	3	<1
	16-60	---	---	---	---	---	-----	---			
Vebar-----	0-7	10-18	2.0-6.0	0.15-0.17	6.1-7.8	<2	Low-----	0.20	4	3	1-4
	7-30	10-18	2.0-6.0	0.15-0.17	6.6-8.4	<2	Low-----	0.20			
	30-60	---	---	---	---	---	-----	---			
DaA-----	0-7	10-25	0.6-6.0	0.13-0.15	6.1-7.3	<2	Low-----	0.32	3	6	2-4
Daglum	7-25	35-60	<0.2	0.12-0.14	6.1-9.0	2-8	High-----	0.32			
	25-60	35-60	<0.2	0.12-0.14	7.9-9.0	8-16	High-----	0.32			
DuD*:											
Dupree-----	0-3	55-70	<0.2	0.08-0.12	5.6-7.8	<2	Very high	0.37	2	4	<1
	3-15	55-70	<0.06	0.08-0.12	5.6-7.8	<4	Very high	0.37			
	15-60	---	---	---	---	---	-----	---			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors		Wind erodi- bility group	Organic matter
								K	T		Pct
	In	Pct	In/hr	In/in	pH	mmhos/cm					
DuD*: Rock outcrop.											
EkA-----	0-19	10-18	2.0-6.0	0.13-0.20	6.1-8.4	<2	Low-----	0.24	3	3	1-2
Ekalaka	19-26	10-18	0.06-0.2	0.11-0.13	7.4-9.0	2-8	Low-----	0.24			
	26-45	8-18	0.06-6.0	0.06-0.08	7.4-9.0	4-16	Low-----	0.24			
	45-60	---	---	---	---	---	-----	---			
EpB*: Ekalaka-----	0-19	10-18	2.0-6.0	0.13-0.20	6.1-8.4	<2	Low-----	0.24	3	3	1-2
	19-26	10-18	0.06-0.2	0.11-0.13	7.4-9.0	2-8	Low-----	0.24			
	26-45	8-18	0.06-6.0	0.06-0.08	7.4-9.0	4-16	Low-----	0.24			
	45-60	---	---	---	---	---	-----	---			
Parshall-----	0-11	5-20	2.0-6.0	0.16-0.18	6.1-7.3	<2	Low-----	0.20	5	3	1-4
	11-60	5-20	2.0-6.0	0.12-0.17	6.6-7.8	<2	Low-----	0.20			
EvB-----	0-7	5-15	2.0-6.0	0.11-0.16	6.1-7.3	<2	Low-----	0.24	3	3	1-3
Evridge	7-23	5-10	2.0-6.0	0.10-0.14	6.6-8.4	<2	Low-----	0.17			
	23-28	10-18	0.06-0.2	0.09-0.12	7.9-9.0	4-8	Low-----	0.24			
	28-38	10-18	0.06-0.2	0.08-0.11	7.9-9.0	4-16	Low-----	0.24			
	38-60	---	---	---	---	---	-----	---			
EwB*: Evridge-----	0-7	5-15	2.0-6.0	0.11-0.16	6.1-7.3	<2	Low-----	0.24	3	3	1-3
	7-23	5-10	2.0-6.0	0.10-0.14	6.6-8.4	<2	Low-----	0.17			
	23-28	10-18	0.06-0.2	0.09-0.12	7.9-9.0	4-8	Low-----	0.24			
	28-38	10-18	0.06-0.2	0.08-0.11	7.9-9.0	4-16	Low-----	0.24			
	38-60	---	---	---	---	---	-----	---			
Bullock-----	0-4	5-10	2.0-6.0	0.12-0.17	6.1-7.8	<2	Low-----	0.28	3	3	1-2
	4-10	18-35	<0.2	0.13-0.17	7.4-8.4	<4	Moderate	0.37			
	10-15	18-35	<0.06	0.07-0.15	7.4-9.0	4-8	Moderate	0.37			
	15-23	10-35	0.06-2.0	0.07-0.15	7.4-9.0	4-8	Moderate	0.37			
	23-60	---	---	---	---	---	-----	---			
ExB*: Evridge-----	0-7	5-15	2.0-6.0	0.11-0.16	6.1-7.3	<2	Low-----	0.24	3	3	1-3
	7-23	5-10	2.0-6.0	0.10-0.14	6.6-8.4	<2	Low-----	0.17			
	23-28	10-18	0.06-0.2	0.09-0.12	7.9-9.0	4-8	Low-----	0.24			
	28-38	10-18	0.06-0.2	0.08-0.11	7.9-9.0	4-16	Low-----	0.24			
	38-60	---	---	---	---	---	-----	---			
Parchin-----	0-6	5-15	2.0-6.0	0.13-0.16	5.1-7.3	<2	Low-----	0.24	3	3	1-3
	6-10	5-15	2.0-6.0	0.08-0.14	5.6-7.3	<2	Low-----	0.24			
	10-17	18-34	<0.2	0.13-0.15	7.4-9.0	2-8	Moderate	0.37			
	17-24	15-30	0.6-2.0	0.11-0.13	7.4-9.0	2-8	Low-----	0.37			
	24-60	---	---	---	---	---	-----	---			
FaA, FaB-----	0-5	20-27	0.6-2.0	0.18-0.20	6.1-7.3	<2	Low-----	0.28	5	6	2-4
Farnuf	5-14	25-35	0.6-2.0	0.15-0.20	6.6-7.8	<2	Moderate	0.32			
	14-41	25-35	0.6-2.0	0.15-0.20	7.4-8.4	<2	Moderate	0.32			
	41-60	20-35	0.6-2.0	0.15-0.20	7.4-8.4	<2	Moderate	0.32			
FrF*: Flasher-----	0-4	5-15	6.0-20	0.13-0.17	6.6-7.8	<2	Low-----	0.24	2	3	<1
	4-9	0-10	6.0-20	0.08-0.12	6.6-7.8	<2	Low-----	0.17			
	9-60	---	---	---	---	---	-----	---			
Rock outcrop.											

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors		Wind erodi- bility group	Organic matter
	In	Pct	In/hr	In/in	pH	mmhos/cm		K	T		Pct
FtF*:											
Flasher-----	0-4	5-15	6.0-20	0.13-0.17	6.6-7.8	<2	Low-----	0.24	2	3	<1
	4-9	0-10	6.0-20	0.08-0.12	6.6-7.8	<2	Low-----	0.17			
	9-60	---	---	---	---	---	---	---			
Telfer-----	0-11	0-8	6.0-20	0.10-0.12	6.1-7.3	<2	Low-----	0.17	5	2	1-3
	11-60	0-8	6.0-20	0.06-0.10	6.6-7.8	<2	Low-----	0.17			
Ge-----	0-1	10-15	2.0-6.0	0.12-0.15	7.4-9.0	2-4	Low-----	0.37	3	3	2-4
Glenross	1-37	18-30	<0.2	0.13-0.15	>7.8	>8	Moderate	0.32			
	37-60	2-10	6.0-20	0.05-0.07	>8.4	>8	Low-----	0.17			
Gk*:											
Glenross	0-1	10-15	2.0-6.0	0.12-0.15	7.4-9.0	2-4	Low-----	0.37	3	3	2-4
	1-37	18-30	<0.2	0.13-0.15	>7.8	>8	Moderate	0.32			
	37-60	2-10	6.0-20	0.05-0.07	>8.4	>8	Low-----	0.17			
Ekalaka-----	0-19	10-18	2.0-6.0	0.13-0.20	6.1-8.4	<2	Low-----	0.24	3	3	1-2
	19-26	10-18	0.06-0.2	0.11-0.13	7.4-9.0	2-8	Low-----	0.24			
	26-45	8-18	0.06-6.0	0.06-0.08	7.4-9.0	4-16	Low-----	0.24			
	45-60	---	---	---	---	---	---	---			
Gr-----	0-8	27-35	0.2-0.6	0.20-0.23	6.1-7.3	<2	Moderate	0.32	5	7	4-6
Grail	8-39	35-45	0.06-0.6	0.14-0.17	6.6-8.4	<2	High-----	0.32			
	39-60	18-45	0.06-0.6	0.13-0.22	7.4-8.4	<4	Moderate	0.32			
Gs-----	0-17	12-27	0.6-2.0	0.22-0.24	6.1-7.3	<2	Moderate	0.32	5	6	3-6
Grassna	17-60	18-30	0.6-2.0	0.16-0.22	6.6-8.4	<2	Moderate	0.32			
Hd-----	0-3	12-25	0.06-0.2	0.20-0.24	6.6-8.4	<2	Moderate	0.37	3	6	2-5
Harriet	3-40	35-50	<0.06	0.10-0.15	>7.3	4-16	High-----	0.37			
	40-60	18-45	0.06-0.2	0.10-0.15	>7.8	4-16	Moderate	0.37			
Hf, Hg, Hn-----	0-4	15-35	0.6-2.0	0.20-0.24	7.4-7.8	<2	Moderate	0.32	5	4L	<1
Havrelon	4-60	18-30	0.6-2.0	0.15-0.19	7.4-7.8	<2	Moderate	0.32			
HrA*:											
Havrelon-----	0-4	15-35	0.6-2.0	0.20-0.24	7.4-7.8	<2	Moderate	0.32	5	4L	<1
	4-60	18-30	0.6-2.0	0.15-0.19	7.4-7.8	<2	Moderate	0.32			
Rhoades-----	0-3	10-27	0.6-6.0	0.13-0.15	5.6-7.3	<2	Low-----	0.32	3	6	2-6
	3-25	35-50	<0.2	0.10-0.12	>6.5	2-16	High-----	0.32			
	25-60	20-45	<0.2	0.10-0.12	>7.3	8-16	High-----	0.32			
Hs-----	0-2	18-35	<0.06	0.15-0.24	5.6-7.3	<2	Moderate	0.28	3	6	3-6
Heil	2-18	45-60	<0.06	0.13-0.18	6.6-9.0	4-16	High-----	0.28			
	18-60	20-50	<0.06	0.13-0.18	7.4-9.0	4-16	High-----	0.28			
HuB-----	0-2	20-26	0.6-2.0	0.19-0.22	6.1-7.3	<2	Moderate	0.37	3	6	<1
Hurley	2-30	60-70	<0.06	0.05-0.13	7.4-8.4	4-16	Very high	0.37			
	30-60	---	<0.06	0.15-0.20	6.1-7.3	<2	High-----	0.37			
HwA*:											
Hurley-----	0-2	20-26	0.6-2.0	0.19-0.22	6.1-7.3	<2	Moderate	0.37	3	6	<1
	2-30	60-70	<0.06	0.05-0.13	7.4-8.4	4-16	Very high	0.37			
	30-60	---	<0.06	0.15-0.20	6.1-7.3	<2	High-----	0.37			
Slickspots.											

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors		Wind erodi- bility group	Organic matter
								K	T		
	In	Pct	In/hr	In/in	pH	mmhos/cm					Pct
Ka, Kc----- Korchea	0-9	18-27	0.6-2.0	0.17-0.21	6.6-8.4	<2	Low-----	0.28	5	4L	1-4
	9-60	18-35	0.6-2.0	0.16-0.18	7.4-9.0	<2	Moderate	0.28			
La----- Lallie	0-2	27-40	0.06-0.2	0.12-0.19	7.4-8.4	4-16	Moderate	0.37	5	6	<1
	2-60	35-60	0.06-0.2	0.10-0.19	7.9-9.0	4-16	High-----	0.37			
LaA, LeB----- Lehr	0-6	10-27	2.0-6.0	0.17-0.22	6.6-7.3	<2	Low-----	0.28	3	5	1-3
	6-17	18-30	2.0-6.0	0.17-0.20	6.6-8.4	<2	Moderate	0.28			
	17-30	0-10	6.0-20	0.09-0.11	7.4-8.4	<2	Low-----	0.10			
	30-60	0-10	>6.0	0.02-0.04	7.4-8.4	<2	Low-----	0.10			
Mc----- McKenzie	0-3	40-60	<0.06	0.13-0.17	7.4-9.0	2-8	High-----	0.28	5	4	3-6
	3-23	40-60	<0.06	0.13-0.17	7.4-9.0	2-8	High-----	0.28			
	23-60	40-60	<0.06	0.13-0.17	7.4-9.0	2-8	High-----	0.28			
OaB, OaC----- Opal	0-4	55-65	<0.06	0.10-0.14	6.6-7.8	<2	Very high	0.37	4	4	2-4
	4-22	60-70	<0.06	0.08-0.14	6.6-8.4	<2	Very high	0.37			
	22-36	60-70	<0.06	0.08-0.12	7.4-8.4	2-4	Very high	0.37			
	36-60	---	---	---	5.1-8.4	<2	Very high	----			
OdC*: Opal-----	0-4	55-65	<0.06	0.10-0.14	6.6-7.8	<2	Very high	0.37	4	4	2-4
	4-22	60-70	<0.06	0.08-0.14	6.6-8.4	<2	Very high	0.37			
	22-36	60-70	<0.06	0.08-0.12	7.4-8.4	2-4	Very high	0.37			
	36-60	---	---	---	5.1-8.4	<2	Very high	----			
Dupree-----	0-3	55-70	<0.2	0.08-0.12	5.6-7.8	<2	Very high	0.37	2	4	<1
	3-15	55-70	<0.06	0.08-0.12	5.6-7.8	<4	Very high	0.37			
	15-60	---	---	---	---	---	-----	----			
OhB*: Opal-----	0-4	55-65	<0.06	0.10-0.14	6.6-7.8	<2	Very high	0.37	4	4	2-4
	4-22	60-70	<0.06	0.08-0.14	6.6-8.4	<2	Very high	0.37			
	22-36	60-70	<0.06	0.08-0.12	7.4-8.4	2-4	Very high	0.37			
	36-60	---	---	---	5.1-8.4	<2	Very high	----			
Hurley-----	0-2	20-26	0.6-2.0	0.19-0.22	6.1-7.3	<2	Moderate	0.37	3	6	<1
	2-30	60-70	<0.06	0.05-0.13	7.4-8.4	4-16	Very high	0.37			
	30-60	---	<0.06	0.15-0.20	6.1-7.3	<2	High-----	0.37			
OsC*: Opal-----	0-4	55-65	<0.06	0.10-0.14	6.6-7.8	<2	Very high	0.37	4	4	2-4
	4-22	60-70	<0.06	0.08-0.14	6.6-8.4	<2	Very high	0.37			
	22-36	60-70	<0.06	0.08-0.12	7.4-8.4	2-4	Very high	0.37			
	36-60	---	---	---	5.1-8.4	<2	Very high	----			
Sansarc-----	0-4	55-65	0.06-0.2	0.08-0.12	6.6-8.4	<2	Very high	0.37	2	4	1-2
	4-16	55-65	0.06-0.2	0.06-0.12	7.4-8.4	<2	Very high	0.37			
	16-60	---	---	---	---	---	-----	----			
PaB----- Parchin	0-6	5-15	2.0-6.0	0.13-0.16	5.1-7.3	<2	Low-----	0.24	3	3	1-3
	6-10	5-15	2.0-6.0	0.08-0.14	5.6-7.3	<2	Low-----	0.24			
	10-17	18-34	<0.2	0.13-0.15	7.4-9.0	2-8	Moderate	0.37			
	17-24	15-30	0.6-2.0	0.11-0.13	7.4-9.0	2-8	Low-----	0.37			
	24-60	---	---	---	---	---	-----	----			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction pH	Salinity mmhos/cm	Shrink- swell potential	Erosion factors		Wind erodi- bility group	Organic matter Pct
								K	T		
	In	Pct	In/hr	In/in	pH	mmhos/cm					
PdD*:											
Parchin-----	0-6	5-15	2.0-6.0	0.13-0.16	5.1-7.3	<2	Low-----	0.24	3	3	1-3
	6-10	5-15	2.0-6.0	0.08-0.14	5.6-7.3	<2	Low-----	0.24			
	10-17	18-34	<0.2	0.13-0.15	7.4-9.0	2-8	Moderate	0.37			
	17-24	15-30	0.6-2.0	0.11-0.13	7.4-9.0	2-8	Low-----	0.37			
	24-60	---	---	---	---	---	---	---			
Bullock-----	0-4	5-10	2.0-6.0	0.12-0.17	6.1-7.8	<2	Low-----	0.28	3	3	1-2
	4-10	18-35	<0.2	0.13-0.17	7.4-8.4	<4	Moderate	0.37			
	10-15	18-35	<0.06	0.07-0.15	7.4-9.0	4-8	Moderate	0.37			
	15-23	10-35	0.06-2.0	0.07-0.15	7.4-9.0	4-8	Moderate	0.37			
	23-60	---	---	---	---	---	---	---			
Cabba-----	0-4	20-27	0.6-2.0	0.18-0.20	6.6-8.4	<2	Moderate	0.32	2	4L	.5-1
	4-10	20-35	0.6-2.0	0.16-0.18	7.4-8.4	2-8	Moderate	0.32			
	10-60	---	---	---	---	---	---	---			
PeA-----	0-11	5-20	2.0-6.0	0.16-0.18	6.1-7.3	<2	Low-----	0.20	5	3	1-4
Parshall	11-60	5-20	2.0-6.0	0.12-0.17	6.6-7.8	<2	Low-----	0.20			
Pg*. Pits											
PrA, PrB-----	0-9	50-60	<0.2	0.10-0.14	6.1-7.8	<2	Very high	0.37	5	4	2-4
Promise	9-34	60-65	<0.2	0.08-0.14	7.4-8.4	<2	Very high	0.37			
	34-60	50-65	<0.2	0.10-0.12	7.4-9.0	2-4	Very high	0.37			
RaA, RaB, RaC----	0-6	10-27	0.6-2.0	0.20-0.23	6.1-7.3	<2	Moderate	0.28	4	6	3-5
Reeder	6-34	18-35	0.6-2.0	0.15-0.18	6.6-8.4	<2	Moderate	0.28			
	34-60	---	---	---	---	---	---	---			
RcB*, RcC*:											
Reeder-----	0-6	10-27	0.6-2.0	0.20-0.23	6.1-7.3	<2	Moderate	0.28	4	6	3-5
	6-34	18-35	0.6-2.0	0.15-0.18	6.6-8.4	<2	Moderate	0.28			
	34-60	---	---	---	---	---	---	---			
Cabba-----	0-4	20-27	0.6-2.0	0.18-0.20	6.6-8.4	<2	Moderate	0.32	2	4L	.5-1
	4-10	20-35	0.6-2.0	0.16-0.18	7.4-8.4	<2	Moderate	0.32			
	10-60	---	---	---	---	---	---	---			
RhB*:											
Reeder-----	0-6	10-27	0.6-2.0	0.20-0.23	6.1-7.3	<2	Moderate	0.28	4	6	3-5
	6-34	18-35	0.6-2.0	0.15-0.18	6.6-8.4	<2	Moderate	0.28			
	34-60	---	---	---	---	---	---	---			
Rhodes-----	0-3	10-27	0.6-6.0	0.13-0.15	5.6-7.3	<2	Low-----	0.32	3	6	2-6
	3-25	35-50	<0.2	0.10-0.12	>6.5	2-16	High-----	0.32			
	25-49	20-45	<0.2	0.10-0.12	>7.3	8-16	High-----	0.32			
	49-60	---	---	---	---	---	---	---			
RnA, RnB-----	0-6	27-40	0.06-0.2	0.17-0.20	6.1-7.3	<2	High-----	0.32	4	7	1-5
Regent	6-33	35-50	0.06-0.2	0.17-0.20	7.4-9.0	<8	High-----	0.32			
	33-60	---	---	---	---	---	---	---			
RpC*:											
Regent-----	0-6	27-40	0.06-0.2	0.17-0.20	6.1-7.3	<2	High-----	0.32	4	7	1-5
	6-33	35-50	0.06-0.2	0.17-0.20	7.4-9.0	<8	High-----	0.32			
	33-60	---	---	---	---	---	---	---			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors		Wind erodi- bility	Organic matter
	In	Pct	In/hr	In/in	pH	mmhos/cm		K	T	group	Pct
RpC*:											
Wayden-----	0-5	35-40	0.2-0.6	0.18-0.23	7.4-9.0	<2	High-----	0.32	2	4L	<1
	5-18	35-50	0.06-0.2	0.14-0.19	7.4-9.0	<8	High-----	0.32			
	18-60	---	---	---	---	---	-----	---			
RrA-----	0-3	10-27	0.6-6.0	0.13-0.15	5.6-7.3	<2	Low-----	0.32	3	6	2-6
Rhoades	3-25	35-50	<0.2	0.10-0.12	>6.5	2-16	High-----	0.32			
	25-49	20-45	<0.2	0.10-0.12	>7.3	8-16	High-----	0.32			
	49-60	---	---	---	---	---	-----	---			
RsB*:											
Rhoades-----	0-3	10-27	0.6-6.0	0.13-0.15	5.6-7.3	<2	Low-----	0.32	3	6	2-6
	3-25	35-50	<0.2	0.10-0.12	>6.5	2-16	High-----	0.32			
	25-49	20-45	<0.2	0.10-0.12	>7.3	8-16	High-----	0.32			
	49-60	---	---	---	---	---	-----	---			
Daglum-----	0-7	10-25	0.6-6.0	0.13-0.15	6.1-7.3	<2	Low-----	0.32	3	6	2-4
	7-25	35-60	<0.2	0.12-0.14	6.1-9.0	2-8	High-----	0.32			
	25-60	35-60	<0.2	0.12-0.14	7.9-9.0	8-16	High-----	0.32			
RtB*:											
Rhoades-----	0-3	10-27	0.6-6.0	0.13-0.15	5.6-7.3	<2	Low-----	0.32	3	6	2-6
	3-25	35-50	<0.2	0.10-0.12	>6.5	2-16	High-----	0.32			
	25-49	20-45	<0.2	0.10-0.12	>7.3	8-16	High-----	0.32			
	49-60	---	---	---	---	---	-----	---			
Daglum-----	0-7	10-25	0.6-6.0	0.13-0.15	6.1-7.3	<2	Low-----	0.32	3	6	2-4
	7-25	35-60	<0.2	0.12-0.14	6.1-9.0	2-8	High-----	0.32			
	25-60	35-60	<0.2	0.12-0.14	7.9-9.0	8-16	High-----	0.32			
Slickspots.											
RuB*:											
Rhoades-----	0-3	10-27	0.6-6.0	0.13-0.15	5.6-7.3	<2	Low-----	0.32	3	6	2-6
	3-25	35-50	<0.2	0.10-0.12	>6.5	2-16	High-----	0.32			
	25-49	20-45	<0.2	0.10-0.12	>7.3	8-16	High-----	0.32			
	49-60	---	---	---	---	---	-----	---			
Slickspots.											
RvE*:											
Rhoades-----	0-3	10-27	0.6-6.0	0.13-0.15	5.6-7.3	<2	Low-----	0.32	3	6	2-6
	3-25	35-50	<0.2	0.10-0.12	>6.5	2-16	High-----	0.32			
	25-49	20-45	<0.2	0.10-0.12	>7.3	8-16	High-----	0.32			
	49-60	---	---	---	---	---	-----	---			
Slickspots.											
Rock outcrop.											
RzF*:											
Rock outcrop.											
Cabba-----	0-4	20-27	0.6-2.0	0.18-0.20	6.6-8.4	<2	Moderate	0.32	2	4L	.5-1
	4-10	20-35	0.6-2.0	0.16-0.18	7.4-8.4	2-8	Moderate	0.32			
	10-60	---	---	---	---	---	-----	---			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors		Wind erodi- bility	Organic matter
	In	Pct	In/hr	In/in	pH	mmhos/cm		K	T	group	Pct
SbE*:											
Sansarc-----	0-4	55-65	0.06-0.2	0.08-0.12	6.6-8.4	<2	Very high	0.37	2	4	1-2
	4-16	55-65	0.06-0.2	0.06-0.12	7.4-8.4	<2	Very high	0.37			
	16-60	---	---	---	---	---	-----	----			
Opal-----	0-4	55-65	<0.06	0.10-0.14	6.6-7.8	<2	Very high	0.37	4	4	2-4
	4-22	60-70	<0.06	0.08-0.14	6.6-8.4	<2	Very high	0.37			
	22-36	60-70	<0.06	0.08-0.12	7.4-8.4	2-4	Very high	0.37			
	36-60	---	---	---	5.1-8.4	<2	Very high	----			
SdD*:											
Sansarc-----	0-4	55-65	0.06-0.2	0.08-0.12	6.6-8.4	<2	Very high	0.37	2	4	1-2
	4-16	55-65	0.06-0.2	0.06-0.12	7.4-8.4	<2	Very high	0.37			
	16-60	---	---	---	---	---	-----	----			
Opal-----	0-4	55-65	<0.06	0.10-0.14	6.6-7.8	<2	Very high	0.37	4	4	2-4
	4-22	60-70	<0.06	0.08-0.14	6.6-8.4	<2	Very high	0.37			
	22-36	60-70	<0.06	0.08-0.12	7.4-8.4	2-4	Very high	0.37			
	36-60	---	---	---	5.1-8.4	<2	Very high	----			
Dupree-----	0-3	55-70	<0.2	0.08-0.12	5.6-7.8	<2	Very high	0.37	2	4	<1
	3-15	55-70	<0.06	0.08-0.12	5.6-7.8	<4	Very high	0.37			
	15-60	---	---	---	---	---	-----	----			
SeE*:											
Sansarc-----	0-4	55-65	0.06-0.2	0.08-0.12	6.6-8.4	<2	Very high	0.37	2	4	1-2
	4-16	55-65	0.06-0.2	0.06-0.12	7.4-8.4	<2	Very high	0.37			
	16-60	---	---	---	---	---	-----	----			
Wabek-----	0-8	5-15	2.0-6.0	0.13-0.15	6.6-7.8	<2	Low-----	0.20	2	5	1-2
	8-60	0-10	>20	0.02-0.04	6.6-7.8	<2	Low-----	0.10			
SgA, SgB-----	0-7	15-27	0.6-2.0	0.22-0.24	6.1-7.8	<2	Moderate	0.37	5	6	1-3
Savage	7-21	35-45	0.06-0.6	0.12-0.20	6.6-7.8	<2	High-----	0.37			
	21-29	35-45	0.06-0.6	0.12-0.20	7.4-8.4	2-4	High-----	0.37			
	29-60	35-45	0.06-0.6	0.12-0.20	7.4-8.4	4-8	High-----	0.37			
ShA, ShB, ShC----	0-7	10-27	0.6-2.0	0.20-0.22	6.1-7.3	<2	Low-----	0.28	5	6	2-6
Shambo	7-43	18-30	0.6-2.0	0.17-0.19	6.6-7.8	<2	Moderate	0.28			
	43-60	18-30	0.6-2.0	0.17-0.19	7.4-9.0	<2	Moderate	0.28			
StA, StB-----	0-5	18-27	0.6-2.0	0.20-0.22	6.6-7.3	<2	Low-----	0.28	4	6	2-4
Stady	5-15	18-27	0.6-2.0	0.17-0.19	6.6-7.3	<2	Low-----	0.28			
	15-23	18-27	0.6-2.0	0.17-0.19	7.4-8.4	<2	Low-----	0.28			
	23-60	0-5	>20.0	0.02-0.04	7.4-8.4	<2	Low-----	0.10			
TaA-----	0-7	10-20	2.0-6.0	0.14-0.16	6.1-7.3	<2	Low-----	0.20	5	3	1-3
Tally	7-29	5-18	2.0-6.0	0.13-0.15	6.6-8.4	<2	Low-----	0.20			
	29-60	5-18	2.0-6.0	0.11-0.13	7.4-8.4	<2	Low-----	0.20			
TdA-----	0-11	0-8	6.0-20	0.10-0.12	6.1-7.3	<2	Low-----	0.17	5	2	1-3
Telfer	11-60	0-8	6.0-20	0.06-0.10	6.6-7.8	<2	Low-----	0.17			
TeB*:											
Telfer-----	0-11	0-8	6.0-20	0.10-0.12	6.1-7.3	<2	Low-----	0.17	5	2	1-3
	11-60	0-8	6.0-20	0.06-0.10	6.6-7.8	<2	Low-----	0.17			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors		Wind erodi- bility	Organic matter
	In	Pct	In/hr	In/in	pH	mmhos/cm		K	T	group	Pct
TeB*:											
Ekalaka-----	0-19	10-18	2.0-6.0	0.13-0.20	6.1-8.4	<2	Low-----	0.24	3	3	1-2
	19-26	10-18	0.06-0.2	0.11-0.13	7.4-9.0	2-8	Low-----	0.24			
	26-45	8-18	0.06-6.0	0.06-0.08	7.4-9.0	4-16	Low-----	0.24			
	45-60	---	---	---	---	---	-----				
Th-----	0-9	10-20	2.0-6.0	0.12-0.14	6.6-8.4	<2	Low-----	0.20	5	3	1-3
Trembles	9-39	8-15	2.0-6.0	0.11-0.13	7.4-8.4	<2	Low-----	0.20			
	39-60	8-15	2.0-6.0	0.10-0.12	7.4-9.0	<2	Low-----	0.20			
Tm-----	0-9	10-20	2.0-6.0	0.13-0.15	6.6-8.4	<2	Low-----	0.20	5	3	1-3
Trembles	9-39	8-15	2.0-6.0	0.11-0.13	7.4-8.4	<2	Low-----	0.20			
	39-60	8-15	2.0-6.0	0.10-0.12	7.4-9.0	<2	Low-----	0.20			
Tt-----	0-9	10-20	2.0-6.0	0.12-0.14	6.6-8.4	<2	Low-----	0.20	5	3	1-3
Trembles	9-39	8-15	2.0-6.0	0.11-0.13	7.4-8.4	<2	Low-----	0.20			
	39-60	8-15	2.0-6.0	0.10-0.12	7.4-9.0	<2	Low-----	0.20			
VaA, VeB-----	0-7	10-18	2.0-6.0	0.15-0.17	6.1-7.8	<2	Low-----	0.20	4	3	1-4
Vebar	7-30	10-18	2.0-6.0	0.15-0.17	6.6-8.4	<2	Low-----	0.20			
	30-60	---	---	---	---	---	-----				
VhB*:											
Vebar-----	0-7	10-18	2.0-6.0	0.15-0.17	6.1-7.8	<2	Low-----	0.20	4	3	1-4
	7-30	10-18	2.0-6.0	0.15-0.17	6.6-8.4	<2	Low-----	0.20			
	30-60	---	---	---	---	---	-----				
Cohagen-----	0-16	10-18	0.6-6.0	0.13-0.18	6.6-8.4	<2	Low-----	0.24	2	3	<1
	16-60	---	---	---	---	---	-----				
WaD-----	0-8	5-15	2.0-6.0	0.13-0.15	6.6-7.8	<2	Low-----	0.20	2	5	1-2
Wabek	8-60	0-10	>20	0.02-0.04	6.6-7.8	<2	Low-----	0.10			
WcE*:											
Wayden-----	0-5	35-40	0.2-0.6	0.18-0.23	7.4-9.0	<2	High-----	0.32	2	4L	<1
	5-18	35-50	0.06-0.2	0.14-0.19	7.4-9.0	<8	High-----	0.32			
	18-60	---	---	---	---	---	-----				
Cabba-----	0-4	20-27	0.6-2.0	0.18-0.20	6.6-8.4	<2	Moderate	0.32	2	4L	<1
	4-10	20-35	0.6-2.0	0.16-0.18	7.4-8.4	<2	Moderate	0.32			
	10-60	---	---	---	---	---	-----				
WdE*:											
Wayden-----	0-5	27-40	0.06-0.2	0.14-0.17	7.4-8.4	<2	High-----	0.24	2	8	<1
	5-18	35-40	0.06-0.2	0.14-0.17	7.4-9.0	<2	High-----	0.24			
	18-60	---	---	---	---	---	-----				
Cabba-----	0-4	20-35	0.6-2.0	0.12-0.16	6.6-8.4	<4	Moderate	0.17	2	8	1-3
	4-10	20-35	0.6-2.0	0.14-0.18	7.4-9.0	2-8	Moderate	0.32			
	10-60	---	---	---	---	---	-----				
Wt-----	0-5	40-60	0.06-0.2	0.13-0.18	6.1-7.3	<2	High-----	0.37	5	4	3-5
Wendte	5-60	45-55	0.06-0.2	0.11-0.17	6.1-7.3	<2	High-----	0.37			
ZeB-----	0-4	2-8	6.0-20	0.10-0.12	5.6-7.3	<2	Low-----	0.17	5	2	1-2
Zeona	4-60	2-8	6.0-20	0.06-0.10	5.6-8.4	<2	Low-----	0.17			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors		Wind erodi- bility	Organic matter
	In	Pct	In/hr	In/in	pH	mmhos/cm		K	T	group	Pct
ZsD*:											
Zeona-----	0-4	2-8	6.0-20	0.10-0.12	5.6-7.3	<2	Low-----	0.17	5	2	1-2
	4-60	2-8	6.0-20	0.06-0.10	5.6-8.4	<2	Low-----	0.17			
Slickspots.											
Rock outcrop.											

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro- logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth Ft	Kind	Months	Depth In	Hardness		Uncoated steel	Concrete
An----- Arnegard	B	None-----	---	---	3.0-6.0	Perched	Mar-Oct	>60	---	Moderate	High-----	Low.
Bb*. Badland												
Bd----- Banks	A	Occasional--	Brief-----	Mar-Jun	>6.0	---	---	>60	---	Low-----	Moderate	Low.
BeA*: Belfield-----	C	None-----	---	---	>6.0	---	---	40-60	Soft	Low-----	High-----	Moderate.
Daglum-----	D	None-----	---	---	>6.0	---	---	>60	---	Moderate	High-----	Moderate.
BfA, BfB----- Bryant	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	High-----	Low.
BgB*, BgC*: Bryant-----	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	High-----	Low.
Sutley-----	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	High-----	Low.
BlA----- Bullcreek	D	None-----	---	---	>6.0	---	---	>60	---	Low-----	High-----	High.
BmA*: Bullcreek-----	D	None-----	---	---	>6.0	---	---	>60	---	Low-----	High-----	High.
Slickspots.												
BnA----- Bullock	D	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	High.
BrB*: Bullock-----	D	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	High.
Parchin-----	D	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	Moderate.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro- logic group	Flooding			High water table			Bedrock		Risk of corrosion		
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Potential frost action	Uncoated steel	Concrete
					<u>Ft</u>			<u>In</u>				
BsB*:												
Bullock-----	D	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	High.
Parchin-----	D	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	Moderate.
Slickspots.												
BuB*:												
Bullock-----	D	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	High.
Slickspots.												
BvE*:												
Bullock-----	D	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	High.
Slickspots.												
Rock outcrop.												
BzB*:												
Bullock-----	D	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	High.
Telfer-----	A	None-----	---	---	>6.0	---	---	>60	---	Low-----	Moderate	Low.
Parchin-----	D	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	Moderate.
CaF*:												
Cabba-----	D	None-----	---	---	>6.0	---	---	10-20	Soft	Moderate	High-----	Low.
Amor-----	B	None-----	---	---	>6.0	---	---	20-40	Soft	Moderate	High-----	Moderate.
ChD*:												
Cabba-----	D	None-----	---	---	>6.0	---	---	10-20	Soft	Moderate	High-----	Low.
Reeder-----	B	None-----	---	---	>6.0	---	---	20-40	Soft	Moderate	High-----	Moderate.
CeE*:												
Cabba-----	D	None-----	---	---	>6.0	---	---	10-20	Soft	Moderate	High-----	Low.
Shambo-----	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro- logic group	Flooding			High water table			Bedrock		Risk of corrosion		
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Potential frost action	Uncoated steel	Concrete
					<u>Ft</u>			<u>In</u>				
CgF*:												
Cohagen-----	D	None-----	---	---	>6.0	---	---	4-20	Soft	Moderate	Moderate	Low.
Cabba-----	D	None-----	---	---	>6.0	---	---	10-20	Soft	Moderate	High-----	Low.
Rock outcrop.												
CvD*:												
Cohagen-----	D	None-----	---	---	>6.0	---	---	4-20	Soft	Moderate	Moderate	Low.
Vebar-----	B	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	Moderate	Low.
DaA-----	D	None-----	---	---	>6.0	---	---	>60	---	Moderate	High-----	Moderate.
Daglun												
DuD*:												
Dupree-----	D	None-----	---	---	>6.0	---	---	10-20	Soft	Low-----	High-----	Moderate.
Rock outcrop.												
EKA-----	B	None-----	---	---	>6.0	---	---	40-60	Soft	Moderate	High-----	Moderate.
Ekalaka												
EpB*:												
Ekalaka-----	B	None-----	---	---	>6.0	---	---	40-60	Soft	Moderate	High-----	Moderate.
Parshall-----	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
EvB-----	B	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	Moderate.
Evridge												
EwB*:												
Evridge-----	B	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	Moderate.
Bullock-----	D	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	High.
ExB*:												
Evridge-----	B	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	Moderate.
Parchin-----	D	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	Moderate.
FaA, FaB-----	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	High-----	Low.
Farnuf												

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					<u>Ft</u>			<u>In</u>				
FrF*: Flasher-----	D	None-----	---	---	>6.0	---	---	7-20	Soft	Low-----	Moderate	Low.
Rock outcrop.												
FtF*: Flasher-----	D	None-----	---	---	>6.0	---	---	7-20	Soft	Low-----	Moderate	Low.
Telfer-----	A	None-----	---	---	>6.0	---	---	>60	---	Low-----	Moderate	Low.
Ge----- Glenross	D	Occasional	Very brief	Apr-Oct	0-1.0	Apparent	Oct-Jun	>60	---	High-----	High-----	High.
Gk*: Glenross-----	D	Occasional	Very brief	Apr-Oct	0-1.0	Apparent	Oct-Jun	>60	---	High-----	High-----	High.
Ekalaka-----	B	None-----	---	---	>6.0	---	---	40-60	Soft	Moderate	High-----	Moderate.
Gr----- Grail	C	None-----	---	---	>6.0	---	---	>60	---	Moderate	High-----	Low.
Gs----- Grassna	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	High-----	Low.
Hd----- Harriet	D	Occasional	Long-----	Apr-Jun	0-1.0	Apparent	Sep-Jun	>60	---	High-----	High-----	Moderate.
Hf----- Havrelon	B	Rare-----	---	---	>6.0	---	---	>60	---	Moderate	High-----	Low.
Hg----- Havrelon	B	Frequent----	Brief-----	Apr-Jun	>6.0	---	---	>60	---	Moderate	High-----	Low.
Hn----- Havrelon	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	High-----	Low.
HrA*: Havrelon-----	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	High-----	Low.
Rhoades-----	D	None-----	---	---	>6.0	---	---	>60	---	Low-----	High-----	Moderate.
Hs----- Heil	D	None-----	---	---	+1-1.0	Apparent	Mar-Sep	>60	---	Moderate	High-----	Moderate.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
HuB----- Hurley	D	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	Moderate.
HwA*: Hurley----- Slickspots.	D	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	Moderate.
Ka----- Korchea	B	Rare-----	---	---	>6.0	---	---	>60	---	Moderate	High-----	Moderate.
Kc----- Korchea	B	Frequent----	Very brief	Mar-Jun	>6.0	---	---	>60	---	Moderate	High-----	Moderate.
			to brief.									
La----- Lallie	D	Occasional	Brief-----	Apr-Jul	0-1.0	Apparent	Apr-Jun	>60	---	High-----	High-----	Low.
LeA, LeB----- Lehr	B	None-----	---	---	>6.0	---	---	>60	---	Low-----	Moderate	Low.
Mc----- McKenzie	D	None-----	---	---	+ .5-1.0	Perched	Mar-Jun	>60	---	Low-----	High-----	Low.
OaB, OaC----- Opal	D	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	Moderate.
OdC*: Opal-----	D	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	Moderate.
Dupree-----	D	None-----	---	---	>6.0	---	---	10-20	Soft	Low-----	High-----	Moderate.
OhB*: Opal-----	D	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	Moderate.
Hurley-----	D	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	Moderate.
OsC*: Opal-----	D	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	Moderate.
Sansarc-----	D	None-----	---	---	>6.0	---	---	4-20	Soft	Low-----	High-----	Moderate.
PaB----- Parchin	D	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	Moderate.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro- logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					<u>Ft</u>			<u>In</u>				
PdD*: Parchin-----	D	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	Moderate.
Bullock-----	D	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	High.
Cabba-----	D	None-----	---	---	>6.0	---	---	10-20	Soft	Moderate	High-----	Low.
PeA----- Parshall	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
Pg*. Pits												
PrA, PrB----- Promise	D	None-----	---	---	>6.0	---	---	>60	---	Low-----	High-----	Low.
RaA, RaB, RaC----- Reeder	B	None-----	---	---	>6.0	---	---	20-40	Soft	Moderate	High-----	Moderate.
RcB*, RcC*: Reeder-----	B	None-----	---	---	>6.0	---	---	20-40	Soft	Moderate	High-----	Moderate.
Cabba-----	D	None-----	---	---	>6.0	---	---	10-20	Soft	Moderate	High-----	Low.
RhB*: Reeder-----	B	None-----	---	---	>6.0	---	---	20-40	Soft	Moderate	High-----	Moderate.
Rhoades-----	D	None-----	---	---	>6.0	---	---	>40	Soft	Low-----	High-----	Moderate.
RnA, RnB----- Regent	C	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	Moderate.
RpC*: Regent-----	C	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	Moderate.
Wayden-----	D	None-----	---	---	>6.0	---	---	10-20	Soft	Low-----	High-----	Moderate.
RrA----- Rhoades	D	None-----	---	---	>6.0	---	---	>40	Soft	Low-----	High-----	Moderate.
RsB*: Rhoades-----	D	None-----	---	---	>6.0	---	---	>40	Soft	Low-----	High-----	Moderate.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro- logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth Ft	Kind	Months	Depth In	Hardness		Uncoated steel	Concrete
RsB*: Daglum-----	D	None-----	---	---	>6.0	---	---	>60	---	Moderate	High-----	Moderate.
RtB*: Rhoades-----	D	None-----	---	---	>6.0	---	---	>40	Soft	Low-----	High-----	Moderate.
Daglum-----	D	None-----	---	---	>6.0	---	---	>60	---	Moderate	High-----	Moderate.
Slickspots.												
RuB*: Rhoades-----	D	None-----	---	---	>6.0	---	---	>40	Soft	Low-----	High-----	Moderate.
Slickspots.												
RvE*: Rhoades-----	D	None-----	---	---	>6.0	---	---	>40	Soft	Low-----	High-----	Moderate.
Slickspots.												
Rock outcrop.												
RzF*: Rock outcrop.												
Cabba-----	D	None-----	---	---	>6.0	---	---	10-20	Soft	Moderate	High-----	Low.
SbE*: Sansarc-----	D	None-----	---	---	>6.0	---	---	4-20	Soft	Low-----	High-----	Moderate.
Opal-----	D	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	Moderate.
SdD*: Sansarc-----	D	None-----	---	---	>6.0	---	---	4-20	Soft	Low-----	High-----	Moderate.
Opal-----	D	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	High-----	Moderate.
Dupree-----	D	None-----	---	---	>6.0	---	---	10-20	Soft	Low-----	High-----	Moderate.
SeE*: Sansarc-----	D	None-----	---	---	>6.0	---	---	4-20	Soft	Low-----	High-----	Moderate.
Wabek-----	A	None-----	---	---	>6.0	---	---	>60	---	Low-----	Moderate	Low.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro- logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					<u>Ft</u>			<u>In</u>				
SgA, SgB----- Savage	C	None-----	---	---	>6.0	---	---	>60	---	Low-----	High-----	Low.
ShA, ShB, ShC----- Shambo	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
StA, StB----- Stady	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
TaA----- Tally	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	High-----	Low.
TdA----- Telfer	A	None-----	---	---	>6.0	---	---	>60	---	Low-----	Moderate	Low.
TeB*: Telfer-----	A	None-----	---	---	>6.0	---	---	>60	---	Low-----	Moderate	Low.
Ekakaka-----	B	None-----	---	---	>6.0	---	---	40-60	Soft	Moderate	High-----	Moderate.
Th----- Trembles	C	Rare-----	---	---	>6.0	---	---	>60	---	Moderate	High-----	Low.
Tm----- Trembles	B	Occasional	Brief-----	Apr-Jun	>6.0	---	---	>60	---	Moderate	High-----	Low.
Tt----- Trembles	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	High-----	Low.
VeA, VeB----- Vebar	B	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	Moderate	Low.
VhB*: Vebar-----	B	None-----	---	---	>6.0	---	---	20-40	Soft	Low-----	Moderate	Low.
Cohagen-----	D	None-----	---	---	>6.0	---	---	4-20	Soft	Moderate	Moderate	Low.
WaD----- Wabek	A	None-----	---	---	>6.0	---	---	>60	---	Low-----	Moderate	Low.
WcE*, WdE*: Wayden-----	D	None-----	---	---	>6.0	---	---	10-20	Soft	Low-----	High-----	Moderate.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro- logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					<u>Ft</u>			<u>In</u>				
WcE*, WdE*: Cabba-----	D	None-----	---	---	>6.0	---	---	10-20	Soft	Moderate	High-----	Low.
Wt----- Wendte	D	Occasional	Brief-----	Apr-Oct	>6.0	---	---	>60	---	Low-----	High-----	Low.
ZeB----- Zeona	A	None-----	---	---	>6.0	---	---	>60	---	Low-----	Low-----	Low.
ZsD*: Zeona-----	A	None-----	---	---	>6.0	---	---	>60	---	Low-----	Low-----	Low.
Slickspots.												
Rock outcrop.												

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Amor-----	Fine-loamy, mixed Typic Haploborolls
*Arnegard-----	Fine-loamy, mixed Pachic Haploborolls
Banks-----	Sandy, mixed, frigid Typic Ustifluvents
Belfield-----	Fine, montmorillonitic Glossic Natriborolls
Bryant-----	Fine-silty, mixed Typic Haploborolls
Bullcreek-----	Very fine, montmorillonitic, mesic Udic Chromusterts
Bullock-----	Fine-loamy, mixed Borollic Natrargids
Cabba-----	Loamy, mixed (calcareous), frigid, shallow Typic Ustorthents
*Cohagen-----	Loamy, mixed (calcareous), frigid, shallow Typic Ustorthents
Daglum-----	Fine, montmorillonitic Typic Natriborolls
Dupree-----	Clayey, montmorillonitic, mesic, shallow Typic Ustochrepts
Ekalaka-----	Coarse-loamy, mixed Typic Natriborolls
Evridge-----	Coarse-loamy, mixed Typic Natriborolls
Farnuf-----	Fine-loamy, mixed Typic Argiborolls
Flasher-----	Mixed, frigid, shallow Typic Ustipsamments
Glenross-----	Fine-loamy, mixed, frigid Typic Natraqualfs
*Grail-----	Fine, montmorillonitic Pachic Argiborolls
*Grassna-----	Fine-silty, mixed Pachic Haploborolls
Harriet-----	Fine, montmorillonitic, frigid Typic Natraquolls
Havrelon-----	Fine-loamy, mixed (calcareous), frigid Typic Ustifluvents
Heil-----	Fine, montmorillonitic, frigid Typic Natraquolls
Hurley-----	Very fine, montmorillonitic, mesic Leptic Natrustolls
Korchea-----	Fine-loamy, mixed (calcareous), frigid Mollic Ustifluvents
Lallie-----	Fine, montmorillonitic (calcareous), frigid Typic Fluvaquents
Lehr-----	Fine-loamy over sandy or sandy-skeletal, mixed Typic Haploborolls
McKenzie-----	Fine, montmorillonitic (calcareous), frigid Typic Haplaquepts
Opal-----	Very fine, montmorillonitic, mesic Udic Chromusterts
Parchin-----	Fine-loamy, mixed Borollic Natrargids
Parshall-----	Coarse-loamy, mixed Pachic Haploborolls
Promise-----	Very fine, montmorillonitic, mesic Udic Chromusterts
Reeder-----	Fine-loamy, mixed Typic Argiborolls
Regent-----	Fine, montmorillonitic Typic Argiborolls
Rhoades-----	Fine, montmorillonitic Leptic Natriborolls
Sansarc-----	Clayey, montmorillonitic (calcareous), mesic, shallow Typic Ustorthents
Savage-----	Fine, montmorillonitic Typic Argiborolls
Shambo-----	Fine-loamy, mixed Typic Haploborolls
Stady-----	Fine-loamy over sandy or sandy-skeletal, mixed Typic Haploborolls
Sutley-----	Coarse-silty, mixed Entic Haploborolls
Tally-----	Coarse-loamy, mixed Typic Haploborolls
Telfer-----	Sandy, mixed Entic Haploborolls
Trembles-----	Coarse-loamy, mixed (calcareous), frigid Typic Ustifluvents
Vebar-----	Coarse-loamy, mixed Typic Haploborolls
Wabek-----	Sandy-skeletal, mixed Entic Haploborolls
Wayden-----	Clayey, montmorillonitic (calcareous), frigid, shallow Typic Ustorthents
*Wendte-----	Fine, montmorillonitic (calcareous), mesic Vertic Ustifluvents
Zeona-----	Mixed, frigid Ustic Torripsamments

Interpretive Groups

INTERPRETIVE GROUPS

(Dashes indicate that the soil is not assigned to the interpretive group)

Map symbol and soil name	Land capability unit	Range site	Windbreak suitability group*	Pasture suitability group
An----- Arnegard	IIC-3	Loamy Overflow----	1	K
Eb----- Badland	VIIIIs-2	---	10	NS
Ed----- Banks	VIe-8	Sands-----	7	NS
BeA: Belfield----- Daglum-----	IIIs-1 IVs-2	Clayey----- Claypan-----	4 9	E C
BfA----- Bryant	IIC-2	Silty-----	3	F
BfB----- Bryant	IIe-1	Silty-----	3	F
BgB: Bryant----- Sutley-----	IIe-1 IIIe-1	Silty----- Thin Upland-----	3 8	F G
BgC: Bryant----- Sutley-----	IIIe-1 IVe-1	Silty----- Thin Upland-----	3 8	F G
BlA----- Bullcreek	VIIs-5	Dense Clay-----	10	NS
BmA: Bullcreek----- Slickspots-----	VIIs-5 VIIIIs-3	Dense Clay----- ---	10 10	NS NS
BnA----- Bullock	VIIs-1	Thin Claypan-----	10	C
BrB: Bullock----- Parchin-----	VIIs-1 IVe-7	Thin Claypan----- Claypan-----	10 9	C C
BsB: Bullock----- Parchin----- Slickspots-----	VIIs-1 IVe-7 VIIIIs-3	Thin Claypan----- Claypan----- ---	10 9 10	C C NS
BuB: Bullock----- Slickspots-----	VIIs-1 VIIIIs-3	Thin Claypan----- ---	10 10	C NS
BvE: Bullock----- Slickspots----- Rock outcrop-----	VIIs-1 VIIIIs-3 VIIIIs-1	Thin Claypan----- ----- ---	10 10 10	C NS NS

See footnote at end of table.

INTERPRETIVE GROUPS--Continued

Map symbol and soil name	Land capability unit	Range site	Windbreak suitability group*	Pasture suitability group
BzB:				
Bullock-----	VIe-1	Thin Claypan-----	10	C
Telfer-----	IVe-9	Sands-----	5	H
Parchin-----	IVe-7	Claypan-----	9	C
CaF:				
Cabba-----	VIIe-7	Shallow-----	10	NS
Amor-----	VIIe-7	Silty-----	10	NS
CbD:				
Cabba-----	VIe-11	Shallow-----	10	NS
Reeder-----	IVe-1	Silty-----	6	F
CaE:				
Cabba-----	VIe-11	Shallow-----	10	NS
Shambo-----	VIe-11	Silty-----	10	NS
CgF:				
Cohagen-----	VIIe-4	Shallow-----	10	NS
Cabba-----	VIIe-7	Shallow-----	10	NS
Rock outcrop-----	VIIIIs-1	---	10	NS
CvD:				
Cohagen-----	VIe-10	Shallow-----	10	NS
Vebar-----	IVe-8	Sandy-----	6	H
DaA-----	IVs-2	Claypan-----	9	C
Daglum				
DuD:				
Dupree-----	VIe-12	Dense Clay-----	10	NS
Rock outcrop-----	VIIIIs-1	---	---	NS
EkA-----	IVe-13	Sandy-----	5	H
Ekalaka				
EpB:				
Ekalaka-----	IVe-13	Sandy-----	5	H
Parshall-----	IIIe-7	Sandy-----	1	H
EvB-----	IVe-13	Sandy-----	5	H
Evridge				
EwB:				
Evridge-----	IVe-13	Sandy-----	5	H
Bullock-----	VIe-1	Thin Claypan-----	10	C
ExB:				
Evridge-----	IVe-13	Sandy-----	5	H
Parchin-----	IVe-7	Claypan-----	9	C
FaA-----	IIc-2	Silty-----	3	F
Farnuf				
FaB-----	IIe-1	Silty-----	3	F
Farnuf				
FrF:				
Flasher-----	VIIe-4	Shallow-----	10	NS
Rock outcrop-----	VIIIIs-1	---	10	NS

See footnote at end of table.

INTERPRETIVE GROUPS--Continued

Map symbol and soil name	Land capability unit	Range site	Windbreak suitability group*	Pasture suitability group
FtF:				
Flasher-----	VIle-4	Shallow-----	10	NS
Telfer-----	VIe-7	Sands-----	10	NS
Ge-----	VIw-4	Saline Lowland----	10	NS
Glenross				
Gk:				
Glenross-----	VIw-4	Saline Lowland----	10	NS
Ekalaka-----	IVe-13	Sandy-----	5	H
Gr-----	IIC-3	Loamy Overflow----	1	K
Grail				
Gs-----	IIC-3	Loamy Overflow----	1	K
Grassna				
Hd-----	VIIs-1	Saline Lowland----	10	J
Harriet				
Hf-----	IIC-1	Loamy Overflow----	1	F
Havrelon				
Hg-----	VIw-1	Loamy Overflow----	1	F
Havrelon				
Hn-----	IIC-1	Loamy Terrace-----	3	F
Havrelon				
HrA:				
Havrelon-----	IIC-1	Loamy Terrace-----	3	F
Rhoades-----	VIIs-1	Thin Claypan-----	10	C
Hs-----	VIIs-1	Closed Depression--	10	B2
Heil				
HuB-----	VIIs-1	Thin Claypan-----	10	C
Hurley				
HwA:				
Hurley-----	VIIs-1	Thin Claypan-----	10	C
Slickspots-----	VIIIs-3	---	10	NS
Ka-----	IIC-1	Loamy Overflow----	1	F
Korchea				
Kc-----	VIw-1	Loamy Overflow----	1	F
Korchea				
La-----	VIIIs-5	Saline Lowland----	10	NS
Lallie				
LeA-----	IVIs-1	Shallow to Gravel--	6	D2
Lehr				
LeB-----	IVe-6	Shallow to Gravel--	6	D2
Lehr				
Mc-----	Vw-4	Closed Depression--	10	B2
McKenzie				

See footnote at end of table.

INTERPRETIVE GROUPS--Continued

Map symbol and soil name	Land capability unit	Range site	Windbreak suitability group*	Pasture suitability group
OaB----- Opal	IIIe-4	Clayey-----	4	I
OaC----- Opal	IVe-4	Clayey-----	4	I
OdC: Opal----- Dupree-----	IVe-4 VIe-12	Clayey----- Dense Clay-----	4 10	I NS
OhB: Opal----- Hurley-----	IIIe-4 VIe-1	Clayey----- Thin Claypan-----	4 10	I C
OsC: Opal----- Sansarc-----	IVe-4 VIe-12	Clayey----- Shallow Clay-----	4 10	I NS
PaB----- Parchin	IVe-7	Claypan-----	9	C
PdD: Parchin----- Bullock----- Cabba-----	VIe-9 VIe-1 VIe-11	Claypan----- Thin Claypan----- Shallow-----	10 10 10	C C NS
PeA----- Parshall	IIIe-7	Sandy-----	1	H
Pg----- Pits	VIIIe-2	---	10	NS
PrA----- Promise	IIIe-3	Clayey-----	4	I
PrB----- Promise	IIIe-4	Clayey-----	4	I
RaA----- Reeder	IIc-2	Silty-----	6	F
RaB----- Reeder	IIe-1	Silty-----	6	F
RaC----- Reeder	IIIe-1	Silty-----	6	F
RcB: Reeder----- Cabba-----	IIe-1 VIe-11	Silty----- Shallow-----	6 10	F G
RcC: Reeder----- Cabba-----	IIIe-1 VIe-11	Silty----- Shallow-----	6 10	F G
RhB: Reeder----- Rhoades-----	IIe-1 VIe-1	Silty----- Thin Claypan-----	6 10	F C
RnA----- Regent	IIc-2	Clayey-----	4	F

See footnote at end of table.

INTERPRETIVE GROUPS--Continued

Map symbol and soil name	Land capability unit	Range site	Windbreak suitability group*	Pasture suitability group
RnB----- Regent	IIE-1	Clayey-----	4	F
RpC: Regent----- Wayden-----	IIIe-1 VIe-12	Clayey----- Shallow-----	4 10	F G
RrA----- Rhoades	VIe-1	Thin Claypan-----	10	C
RsB: Rhoades----- Daglum-----	VIe-1 IVe-3	Thin Claypan----- Claypan-----	10 9	C C
RtB: Rhoades----- Daglum----- Slickspots-----	VIe-1 IVe-3 VIIIs-3	Thin Claypan----- Claypan----- ---	10 9 10	C C NS
RuB: Rhoades----- Slickspots-----	VIe-1 VIIIs-3	Thin Claypan----- ---	10 10	C NS
RvE: Rhoades----- Slickspots----- Rock outcrop-----	VIe-1 VIIIs-3 VIIIs-1	Thin Claypan----- --- ---	10 10 10	C NS NS
RzF: Rock outcrop----- Cabba-----	VIIIs-1 VIIe-7	--- Shallow-----	10 10	NS NS
SbE: Sansarc----- Opal-----	VIIe-8 VIIe-8	Shallow Clay----- Clayey-----	10 10	NS NS
SdD: Sansarc----- Opal----- Dupree-----	VIe-12 VIe-12 VIe-12	Shallow Clay----- Clayey----- Dense Clay-----	10 10 10	NS NS NS
SeE: Sansarc----- Wabek-----	VIIe-8 VIIIs-4	Shallow Clay----- Very Shallow-----	10 10	NS NS
SgA----- Savage	IIC-2	Clayey-----	3	F
SgB----- Savage	IIE-1	Clayey-----	3	F
ShA----- Shambo	IIC-2	Silty-----	3	F
ShB----- Shambo	IIE-1	Silty-----	3	F
ShC----- Shambo	IIIe-1	Silty-----	3	F

See footnote at end of table.

INTERPRETIVE GROUPS--Continued

Map symbol and soil name	Land capability unit	Range site	Windbreak suitability group*	Pasture suitability group
StA----- Stady	IIIIs-2	Silty-----	6	D1
StB----- Stady	IIIe-6	Silty-----	6	D1
TaA----- Tally	IIIe-8	Sandy-----	5	H
TdA----- Telfer	IVe-9	Sands-----	5	H
TeB: Telfer-----	IVe-9	Sands-----	5	H
Ekalaka-----	IVe-13	Sandy-----	5	H
Th----- Trembles	IIIe-7	Loamy Overflow----	1	H
Tm----- Trembles	VIw-1	Loamy Overflow----	1	H
Tt----- Trembles	IIIe-7	Loamy Terrace-----	5	H
VeA----- Vebar	IIIe-9	Sandy-----	6	H
VeB----- Vebar	IIIe-10	Sandy-----	6	H
VhB: Vebar-----	IIIe-10	Sandy-----	6	H
Cohagen-----	VIe-10	Shallow-----	10	G
WaD----- Wabek	VIIs-4	Very Shallow-----	10	NS
WcE: Wayden-----	VIIe-8	Shallow-----	10	NS
Cabba-----	VIe-11	Shallow-----	10	NS
WdE: Wayden-----	VIIIs-6	Shallow-----	10	NS
Cabba-----	VIIIs-6	Shallow-----	10	NS
Wt----- Wendte	VIw-1	Clayey Overflow----	4	NS
ZeB----- Zeona	VIe-7	Sands-----	7	NS
ZsD: Zeona-----	VIe-7	Sands-----	10	NS
Slickspots-----	VIIIs-3	---	10	NS
Rock outcrop-----	VIIIs-1	---	10	NS

* Soils in windbreak suitability group 10 are unsuited to windbreaks.

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SOIL LEGEND*

GENTLY SLOPING TO STEEP, CLAYEY SOILS
ON DISSECTED PLAINS

1 Sansarc-Dupree-Opal association

2 Opal-Sansarc association

NEARLY LEVEL AND GENTLY SLOPING, LOAMY SOILS
ON FLOOD PLAINS AND TERRACES

3 Trembles-Havrelon-Korchea association

NEARLY LEVEL TO STEEP, SILTY AND LOAMY SOILS
ON DISSECTED PLAINS, OTHER PLAINS, AND TERRACES

4 Reeder-Cabba association

5 Vebar association

6 Bryant association

7 Regent-Reeder association

8 Shambo-Farnuf-Stady association

GENTLY SLOPING TO VERY STEEP, LOAMY SOILS
ON DISSECTED PLAINS

9 Cabba-Wayden association

10 Flasher-Vebar association

NEARLY LEVEL TO STRONGLY SLOPING, LOAMY
SOILS THAT HAVE A CLAYPAN AND OTHER LOAMY
SOILS: ON DISSECTED PLAINS AND OTHER PLAINS

11 Rhoades-Daglum-Reeder association

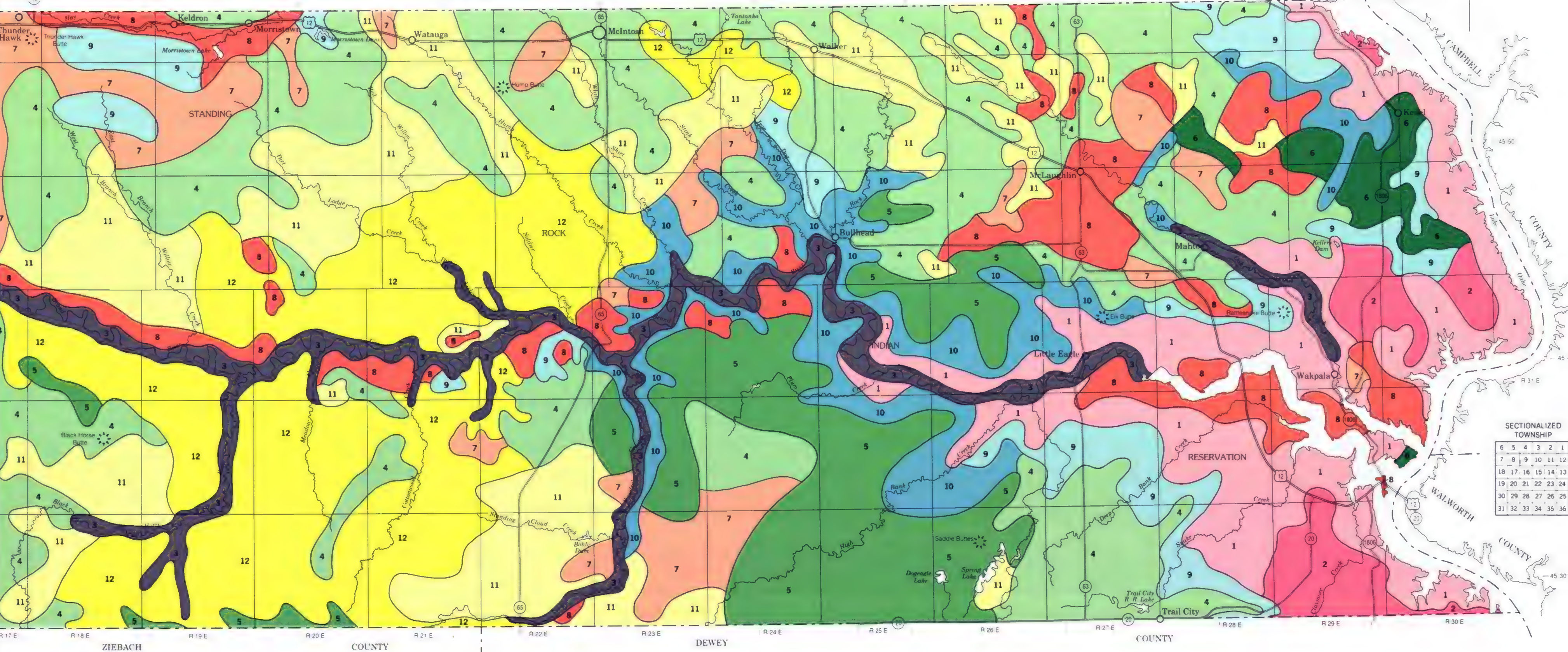
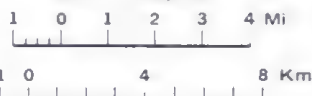
12 Bullock-Parchin association

* The units on this legend are described in the text under
the heading "General Soil Map Units."

Compiled 1994

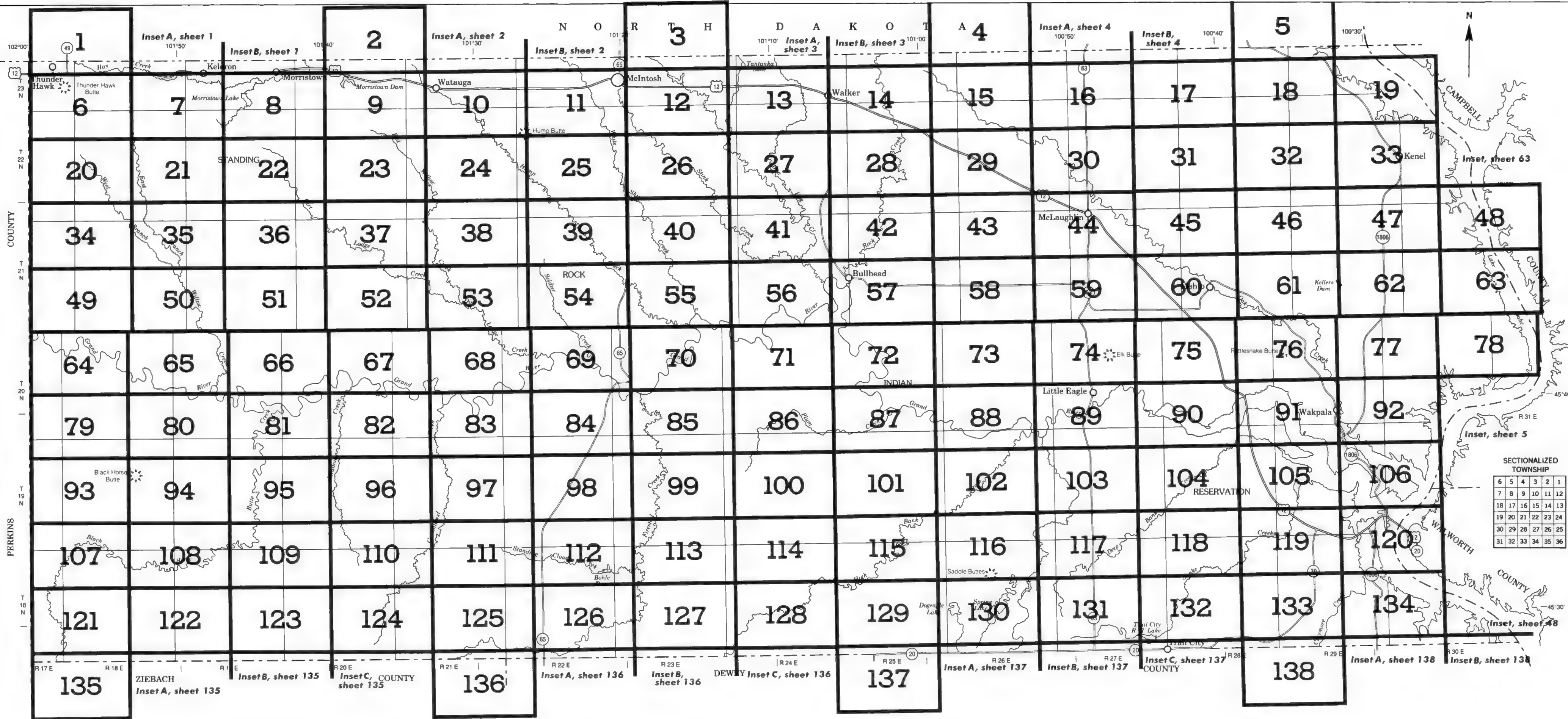
UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
SOUTH DAKOTA AGRICULTURAL EXPERIMENT STATION**GENERAL SOIL MAP**
CORSON COUNTY, SOUTH DAKOTA

Scale 1:253,440

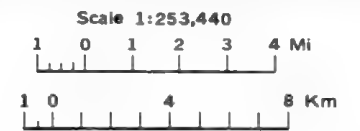


SECTIONALIZED TOWNSHIP											
6	5	4	3	2	1						
7	8	9	10	11	12						
18	17	16	15	14	13						
19	20	21	22	23	24						
30	29	28	27	26	25						
31	32	33	34	35	36						

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



INDEX TO MAP SHEETS
CORSON COUNTY, SOUTH DAKOTA



SOIL LEGEND

Map symbols consist of a combination of letters. The first capital letter is the initial one of the map unit name. The lowercase letter that follows separates map units having names that begin with the same letter, except that it does not separate sloping phases. The second capital letter indicates the class of slope. Symbols without a slope letter are for nearly level soils or miscellaneous areas.

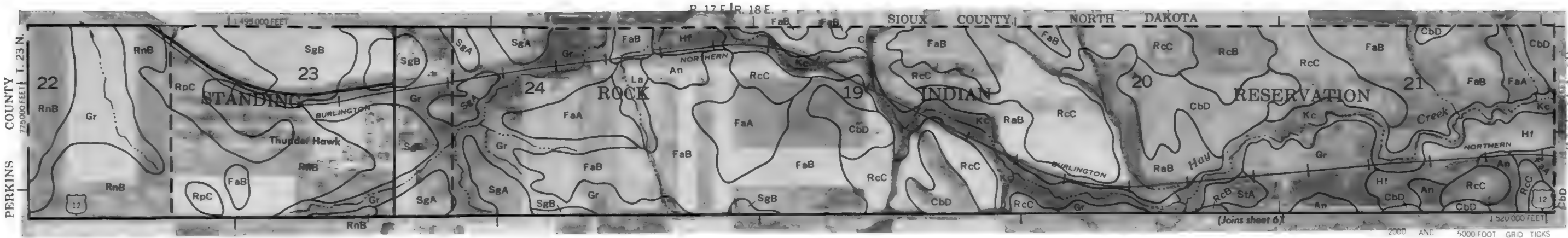
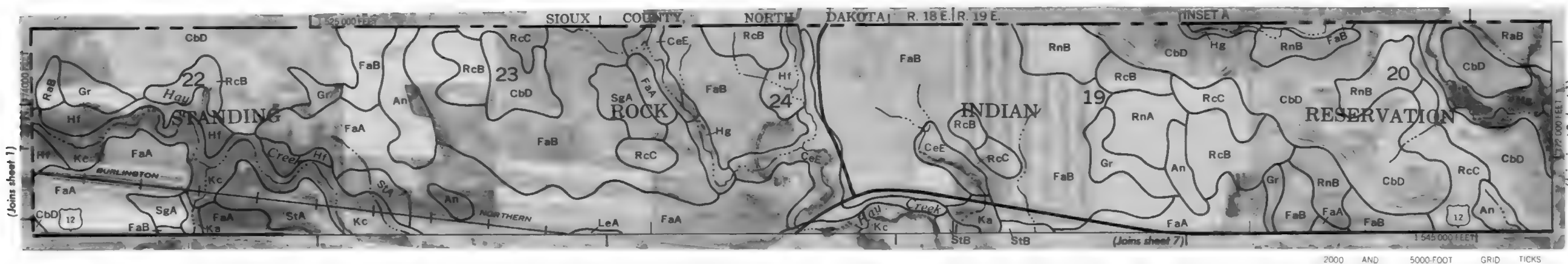
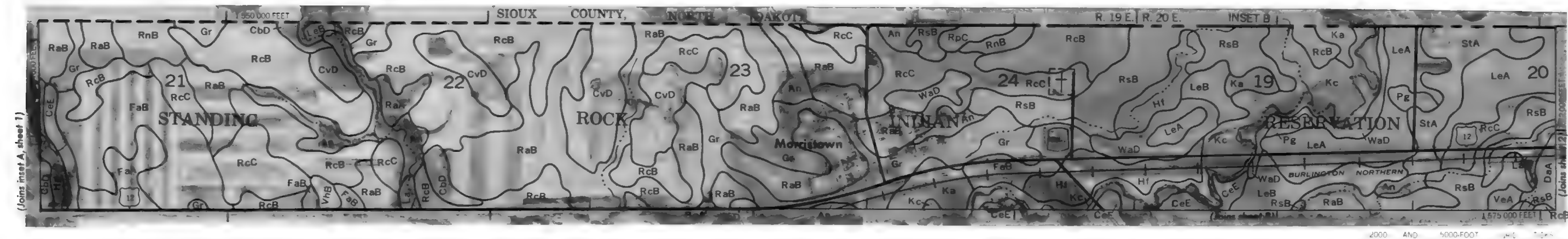
SYMBOL	NAME	SYMBOL	NAME
An	Amegard loam	OaB	Opal clay, 2 to 6 percent slopes
Bb	Banks fine sand	OaC	Opal clay, 6 to 9 percent slopes
Bd	Banks fine sand	OdC	Opal-Dupree clays, 2 to 9 percent slopes
BeA	Bethfield-Daglum complex, 0 to 3 percent slopes	OhB	Opal-Hurley complex, 0 to 9 percent slopes
BIA	Bryant silt loam, 0 to 2 percent slopes	Osc	Opal-Sansarc clays, 6 to 15 percent slopes
BIB	Bryant silt loam, 2 to 6 percent slopes	PaB	Parchin fine sandy loam, 0 to 9 percent slopes
BgB	Bryant-Sutley silt loams, 2 to 6 percent slopes	PdD	Parchin-Bullock-Cabba complex, 6 to 30 percent slopes
BgC	Bryant-Sutley silt loams, 6 to 9 percent slopes	PeA	Parshall fine sandy loam, 0 to 6 percent slopes
BIA	Bullcreek clay, 0 to 4 percent slopes	Pg	Pits, gravel
BmA	Bullcreek-Slickspots complex, 0 to 4 percent slopes	PrA	Promise clay, 0 to 2 percent slopes
BnA	Bullock fine sandy loam, 0 to 6 percent slopes	PrB	Promise clay, 2 to 6 percent slopes
BrB	Bullock-Parchin fine sandy loams, 0 to 9 percent slopes	RaA	Reeder loam, 0 to 2 percent slopes
BsB	Bullock-Parchin-Slickspots complex, 0 to 9 percent slopes	RaB	Reeder loam, 2 to 6 percent slopes
BuB	Bullock-Slickspots complex, 0 to 6 percent slopes	RaC	Reeder loam, 6 to 9 percent slopes
BVE	Bullock-Slickspots-Rock outcrop complex, 0 to 40 percent slopes	RcB	Reeder-Cabba loams, 3 to 6 percent slopes
BzB	Bullock-Teller-Parchin complex, 0 to 9 percent slopes	RcC	Reeder-Cabba loams, 6 to 9 percent slopes
CaF	Cabba-Amor loams, 15 to 60 percent slopes	RhB	Reeder-Rhoades loams, 2 to 9 percent slopes
CbD	Cabba-Reeder loams, 6 to 25 percent slopes	RnA	Regent silty clay loam, 0 to 2 percent slopes
CeE	Cabba-Shambo loams, 6 to 40 percent slopes	RnB	Regent silty clay loam, 2 to 6 percent slopes
CgF	Cohagen-Cabba-Rock outcrop complex, 6 to 70 percent slopes	RpC	Regent-Wayden silty clay loams, 6 to 15 percent slopes
CvD	Cohagen-Verbar fine sandy loams, 6 to 25 percent slopes	RrA	Rhoades loam, 0 to 6 percent slopes
DaA	Daglum loam, 0 to 3 percent slopes	RsB	Rhoades-Daglum loams, 0 to 9 percent slopes
DuD	Dupree-Rock outcrop complex, 6 to 30 percent slopes	RtB	Rhoades-Daglum-Slickspots complex, 0 to 9 percent slopes
EkA	Ekalaka very fine sandy loam, 0 to 6 percent slopes	RuB	Rhoades-Slickspots complex, 0 to 6 percent slopes
EpB	Ekalaka-Parshall complex, 0 to 6 percent slopes	RvE	Rhoades-Slickspots-Rock outcrop complex, 0 to 40 percent slopes
EvB	Evridge fine sandy loam, 0 to 6 percent slopes	RzF	Rock outcrop-Cabba complex, 6 to 40 percent slopes
EWB	Evridge-Bullock fine sandy loams, 0 to 6 percent slopes	SbE	Sansarc-Opal clays, 15 to 40 percent slopes
ExB	Evridge-Parchin fine sandy loams, 0 to 6 percent slopes	SdD	Sansarc-Opal-Dupree clays, 9 to 25 percent slopes
FaA	Farnut loam, 0 to 2 percent slopes	SeE	Sansarc-Wabek complex, 15 to 40 percent slopes
FaB	Farnut loam, 2 to 6 percent slopes	SgA	Savage silt loam, 0 to 3 percent slopes
FrF	Flasher-Rock outcrop complex, 30 to 60 percent slopes	SgB	Savage silt loam, 3 to 6 percent slopes
FtF	Flasher-Teller complex, 15 to 40 percent slopes	ShA	Shambo loam, 0 to 2 percent slopes
Ge	Glenross fine sandy loam	ShB	Shambo loam, 2 to 6 percent slopes
Gk	Glenross-Ekalaka fine sandy loams	ShC	Shambo loam, 6 to 9 percent slopes
Gr	Grail silty clay loam	StA	Stady loam, 0 to 2 percent slopes
Gs	Grassna silt loam	StB	Stady loam, 2 to 6 percent slopes
Hd	Harriet loam	TaA	Tally fine sandy loam, 0 to 6 percent slopes
Hf	Havreton loam	TdA	Teller loamy sand, 0 to 6 percent slopes
Hg	Havreton loam, channeled	TeB	Teller-Ekalaka complex, 0 to 6 percent slopes
Hn	Havreton loam, terrace	Th	Trembles fine sandy loam
HrA	Havreton-Rhoades loams, 0 to 4 percent slopes	Tm	Trembles fine sandy loam, channeled
Hs	Heil silt loam	Tt	Trembles fine sandy loam, terrace
HuB	Hurley silt loam, 0 to 9 percent slopes	VeA	Vebar fine sandy loam, 0 to 2 percent slopes
HwA	Hurley-Slickspots complex, 0 to 6 percent slopes	VeB	Vebar fine sandy loam, 2 to 6 percent slopes
Ka	Korchea loam	VhB	Vebar-Cohagen fine sandy loams, 2 to 9 percent slopes
Kc	Korchea loam, channeled	WaD	Wabek gravelly sandy loam, 2 to 35 percent slopes
La	Lallie silty clay loam	WcE	Wayden-Cabba complex, 9 to 40 percent slopes
LeA	Lehr loam, 0 to 2 percent slopes	WdE	Wayden and Cabba soils, 6 to 40 percent slopes, extremely stony
LeB	Lehr loam, 2 to 6 percent slopes	Wt	Wendite silty clay, channeled
Mc	McKenzie clay	ZeB	Zeona loamy fine sand, 0 to 6 percent slopes
		ZsD	Zeona-Slickspots-Rock outcrop complex, 0 to 30 percent slopes

CONVENTIONAL AND SPECIAL
SYMBOLS LEGEND

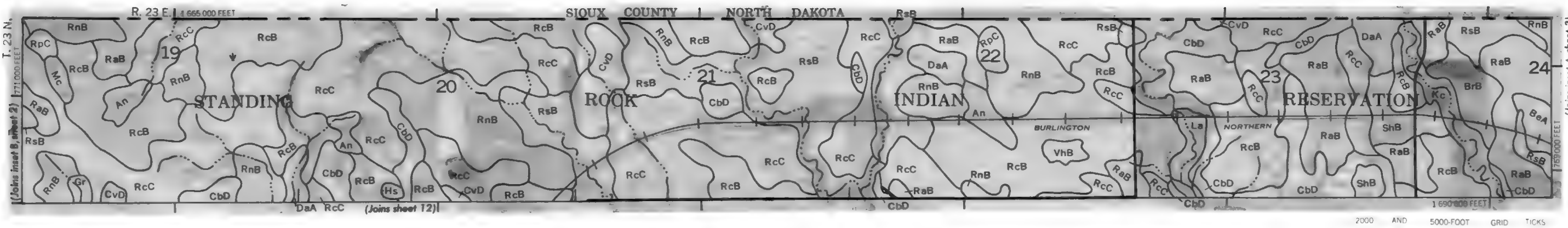
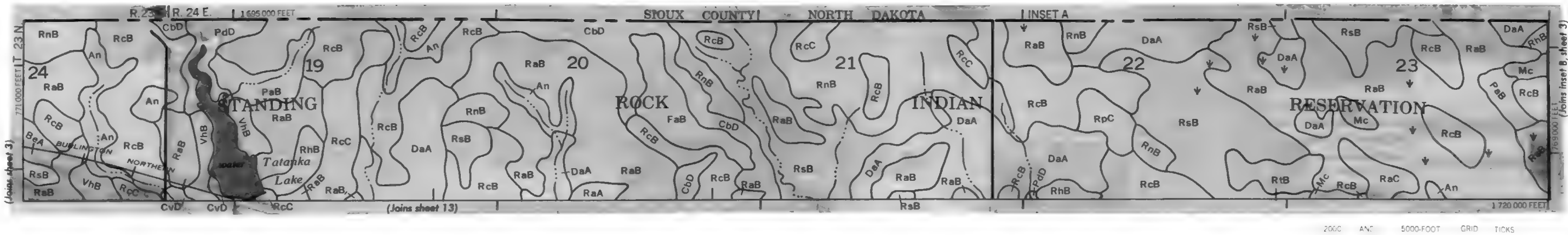
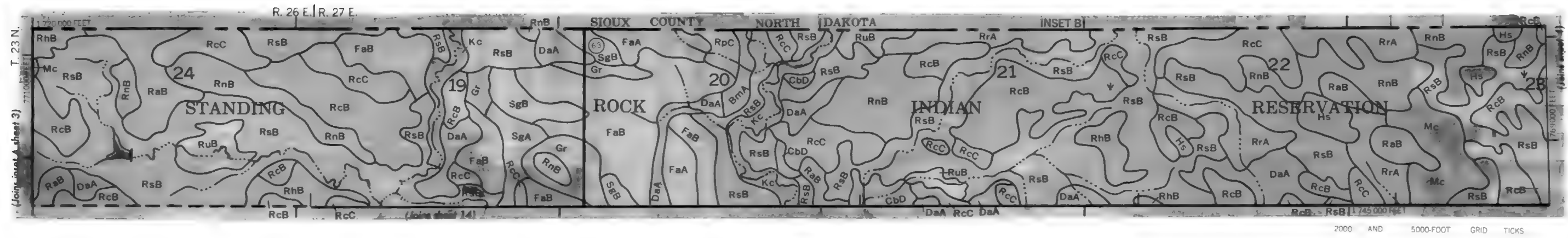
CULTURAL FEATURES	MISCELLANEOUS CULTURAL FEATURES	SPECIAL SYMBOLS FOR SOIL SURVEY
BOUNDARIES		SOIL DELINEATIONS AND SYMBOLS
National, state, or province	Farmstead, house (omit in urban area) (occupied)	ESCARPMENTS
County or parish	Church	Bedrock (points down slope)
Minor civil division	School	Other than bedrock (points down slope)
Reservation (national forest or park, state forest or park, and large airport)	Indian mound (label)	SHORT STEEP SLOPE
Land grant	Located object (label)	GULLY
Limit of soil survey (label)	Tank (label)	DEPRESSION OR SINK (< 5 acres)
Field sheet matchline and neckline	Wells, oil or gas	SOIL SAMPLE (normally not shown)
AD HOC BOUNDARY (label)	Windmill	MISCELLANEOUS
Small airport, airfield, park, oilfield, cemetery, or flood pool	Kitchen midden	Blowout
STATE COORDINATE TICK 1 890 000 FEET		Clay spot
LAND DIVISION CORNER (sections and land grants)		Gravelly spot (< 3 acres)
ROADS		Gumbo, slick or scabby spot (sodic)
Divided (median shown if scale permits)	PERENNIAL, double line	Dumps and other similar non soil areas (< 5 acres)
Other roads	PERENNIAL, single line	Prominent hill or peak
Trail	Intermittent	Rock outcrop (includes sandstone and shale)
ROAD EMBLEM & DESIGNATIONS (not be used on trails on section lines)	Drainage end	Saline spot
Interstate	Canals or ditches	Sandy spot
Federal	Double-line (label)	Severely eroded spot
State	Drainage and/or irrigation	Slide or slip (tips point upslope)
County, farm or ranch	LAKES, PONDS AND RESERVOIRS	Stony spot, very stony spot (< 3 acres)
RAILROAD	Perennial	*For use in areas where bedrock or non-soil is the floor of the basin
POWER TRANSMISSION LINE (normally not shown)	Intermittent	
PIPE LINE (normally not shown)	MISCELLANEOUS WATER FEATURES	
FENCE (normally not shown) (major fences in range areas)	SEWAGE LAGOON	
LEVEES	Marsh or swamp	
Without road	Spring	
With road	Well, artesian	
With railroad	Well, irrigation	
DAMS	Wet spot (< 5 acres) To be used where wet soils are not a named part of a mapping unit or are not named as an inclusion	
Large (to scale)		
Medium or Small (Named where applicable)		
PITS		
Gravel pit (< 5 acres)		
Mine or quarry		

CORSON COUNTY, SOUTH DAKOTA NO. 1

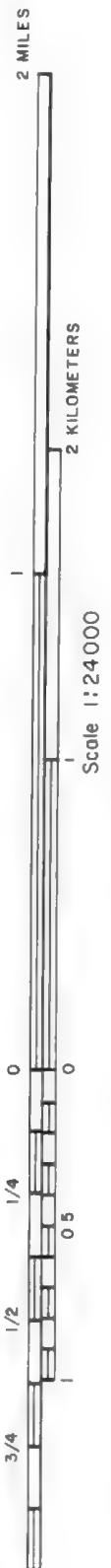
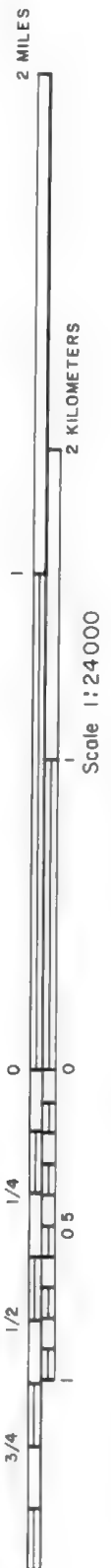
This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximate; positioned.











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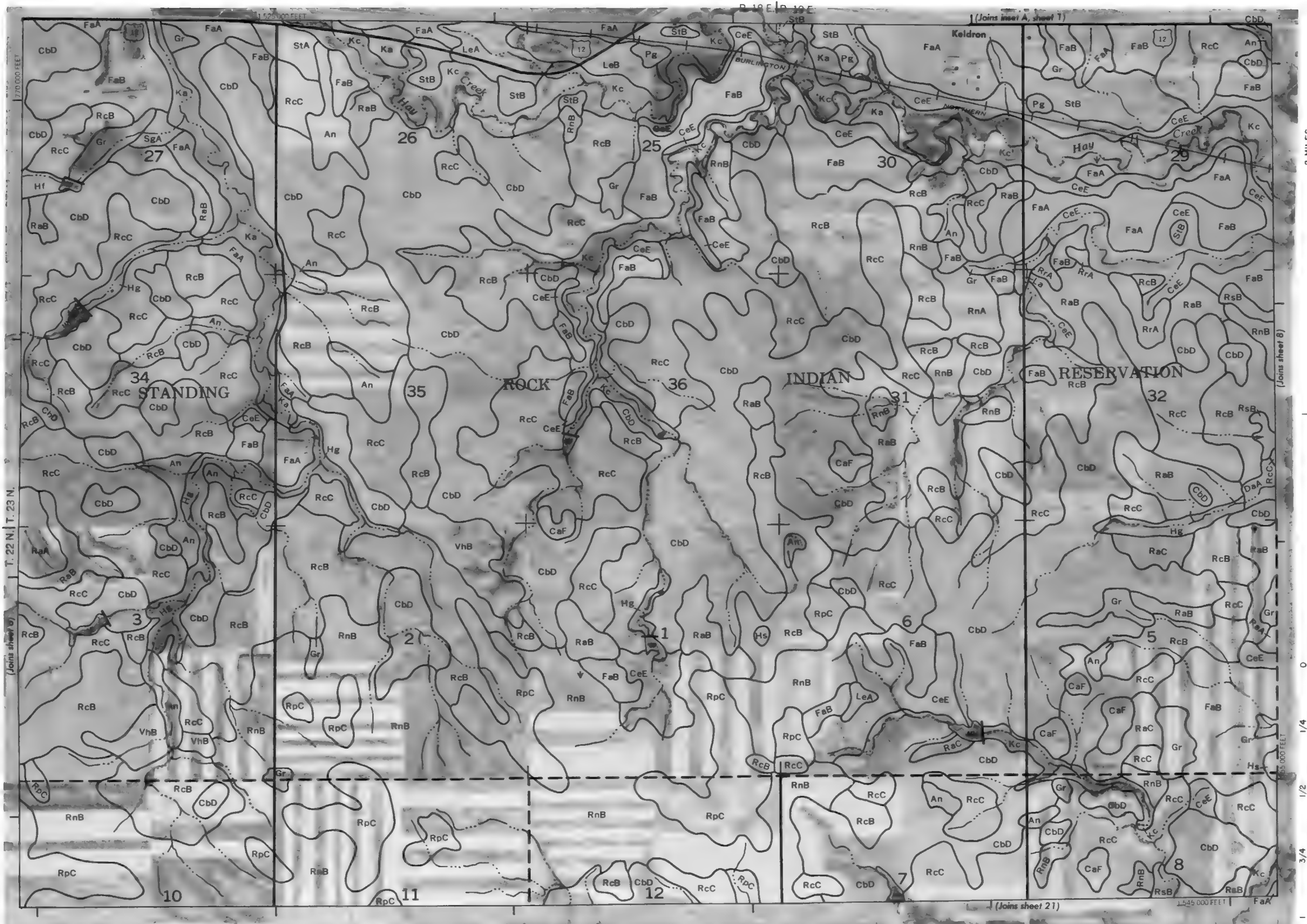
CORSON COUNTY, SOUTH DAKOTA NO. 6



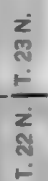
2 MILES

2 KILOMETERS

Scale 1:24000



CORSON COUNTY, SOUTH DAKOTA NO. 7
 This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
 Coordinate grid ticks and land division corners if shown are approximate; positioned.



CORSON COUNTY, SOUTH DAKOTA NO. 8

CORSON COUNTY, SOUTH DAKOTA NO. 9
This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximate. Positioning



10



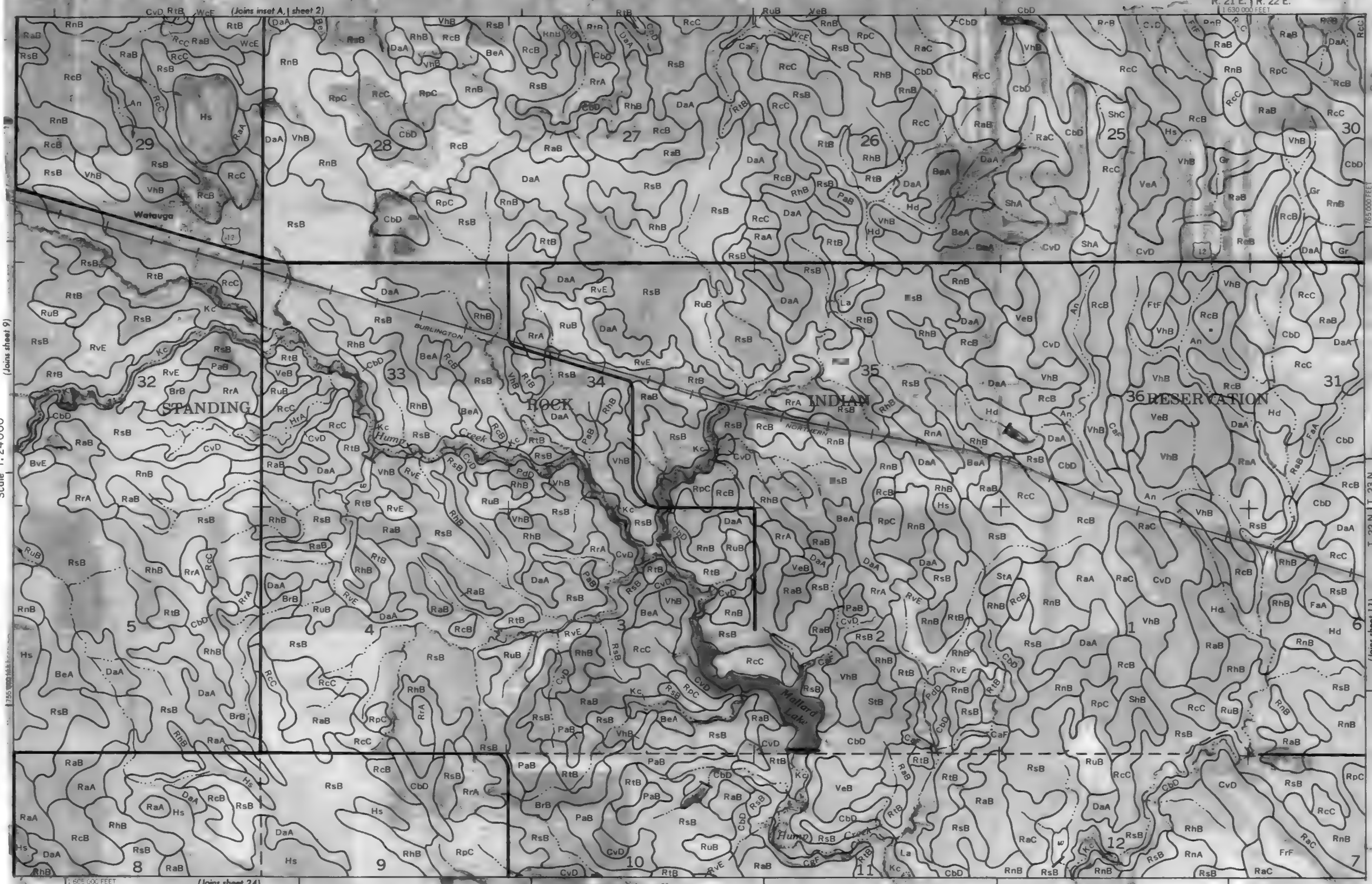
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Scale 1:24,000



R. 21 E. | R. 22 E.
1:630,000 FEET



This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CORSON COUNTY, SOUTH DAKOTA NO. 10

This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.





ordinate grid ticks and land division corners, if shown, are approximately positioned



2 MILES

2 KILOMETERS

Scale 1:24,000

750 000 FEET



CORSON COUNTY, SOUTH DAKOTA NO. 13
This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid lines and land division corners 1/4, 1/2, 3/4, and 1 mile are approximately positioned.

14



2 MILES

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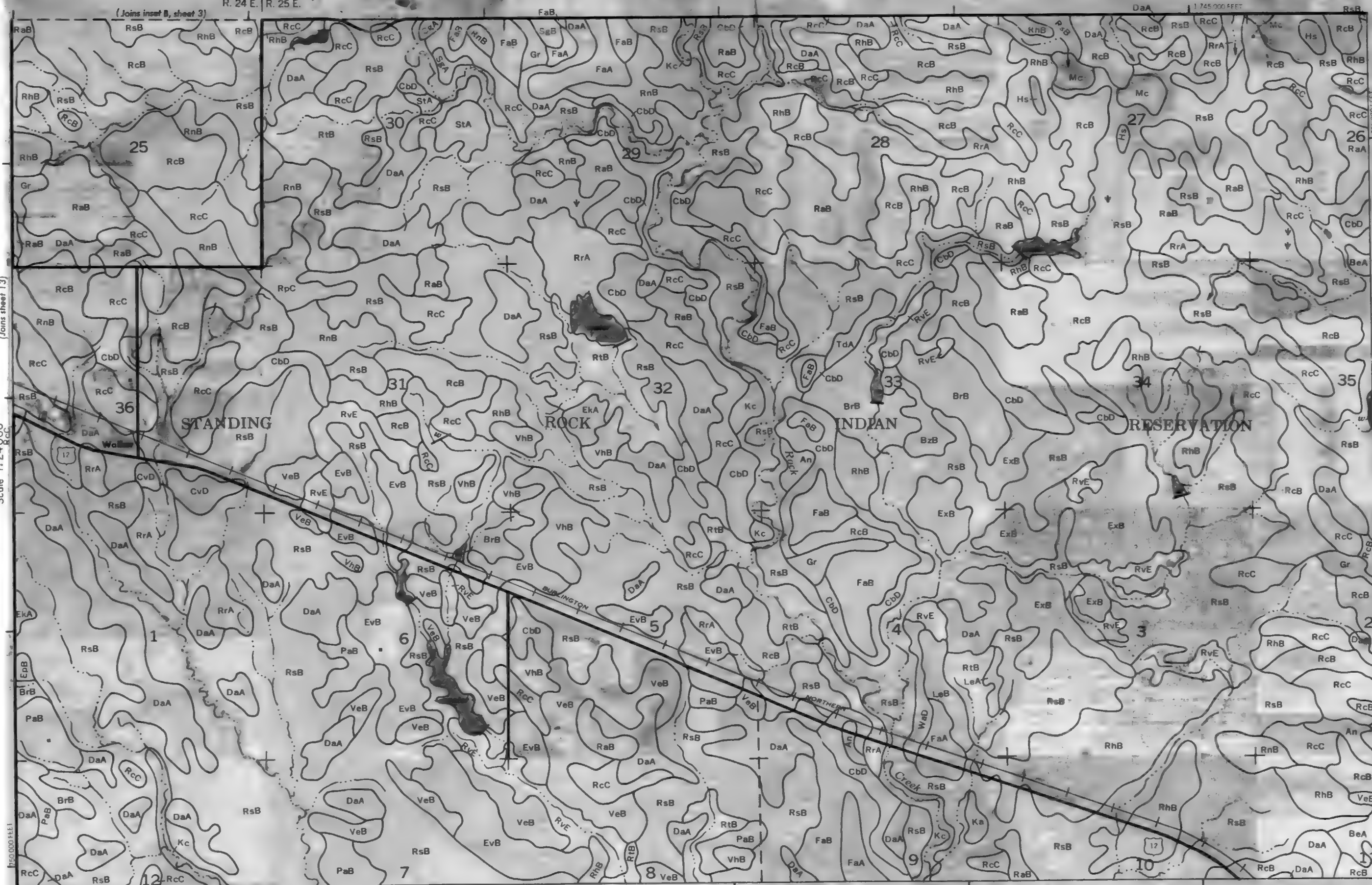
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Scale 1:24,000



1:24,000 FEET

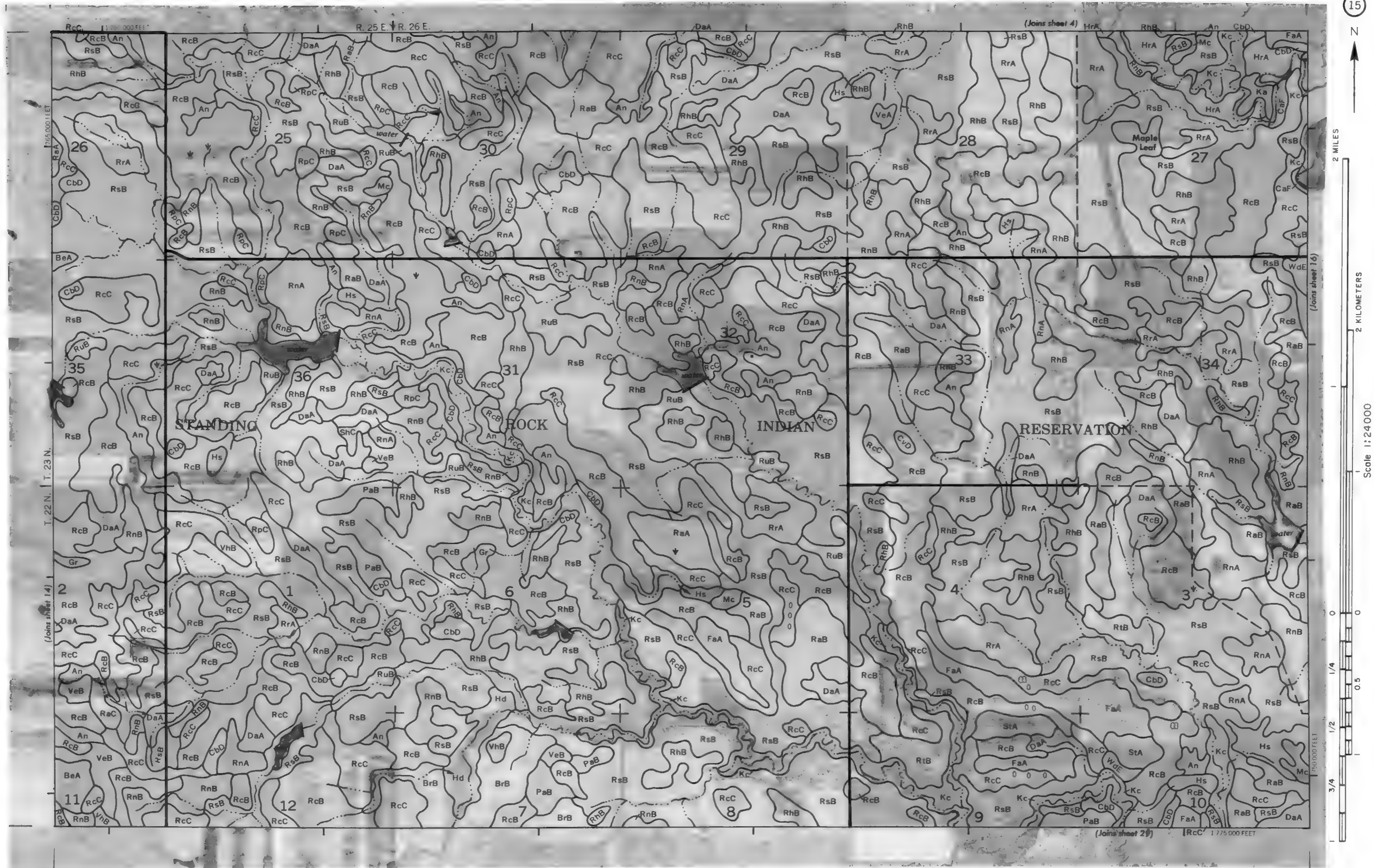
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T. 22 N. T. 23 N.

(Joins sheet 15)

CORSON COUNTY, SOUTH DAKOTA NO. 15
This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture. Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.





R. 27 E. R. 28 E.

1:810,000 FEET

(Joins inset B, sheet 4)



2 MILES

2 KILOMETERS

Scale 1:240,000

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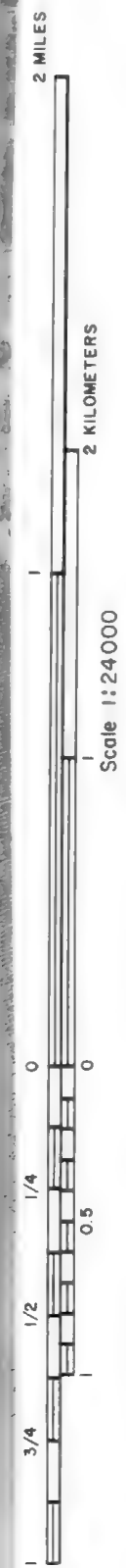
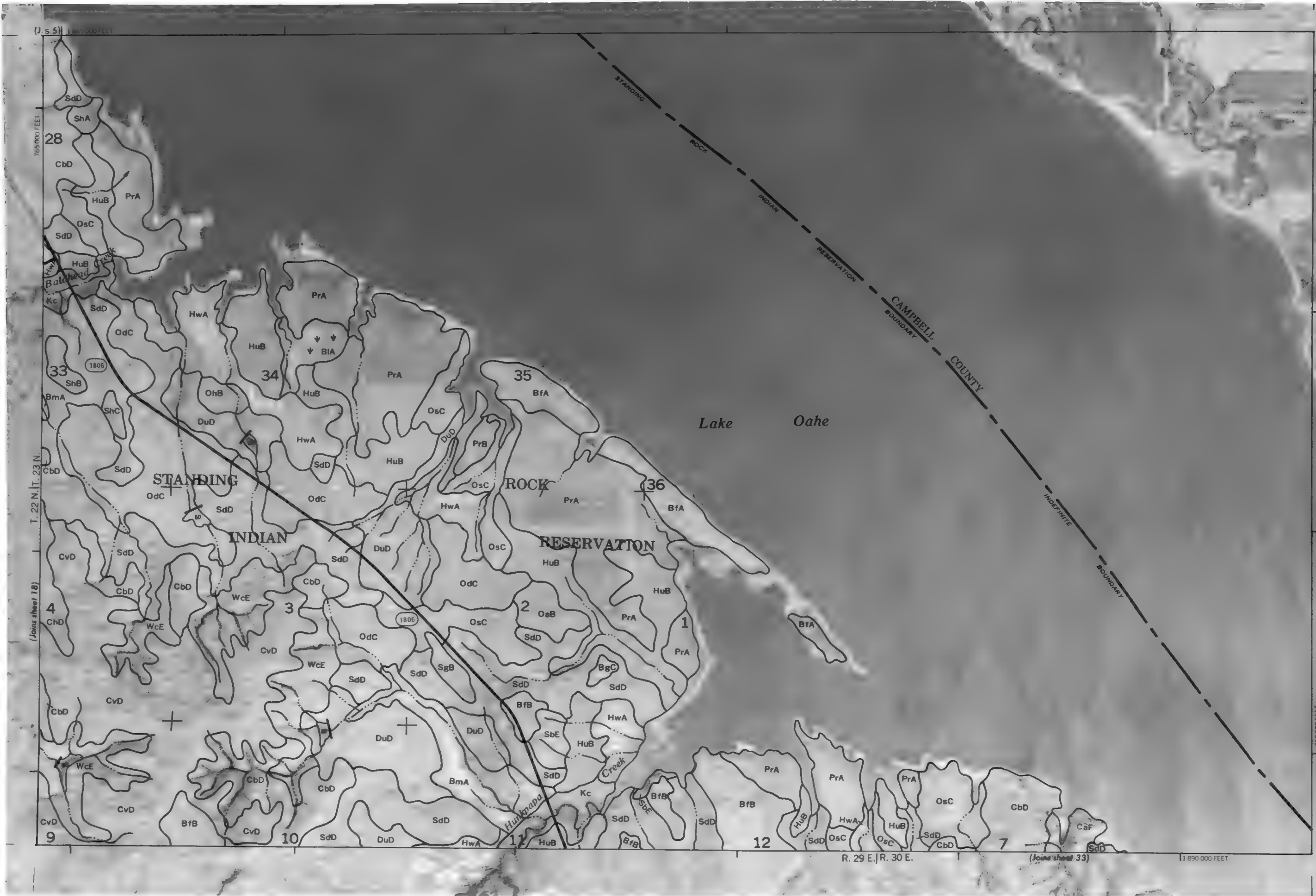
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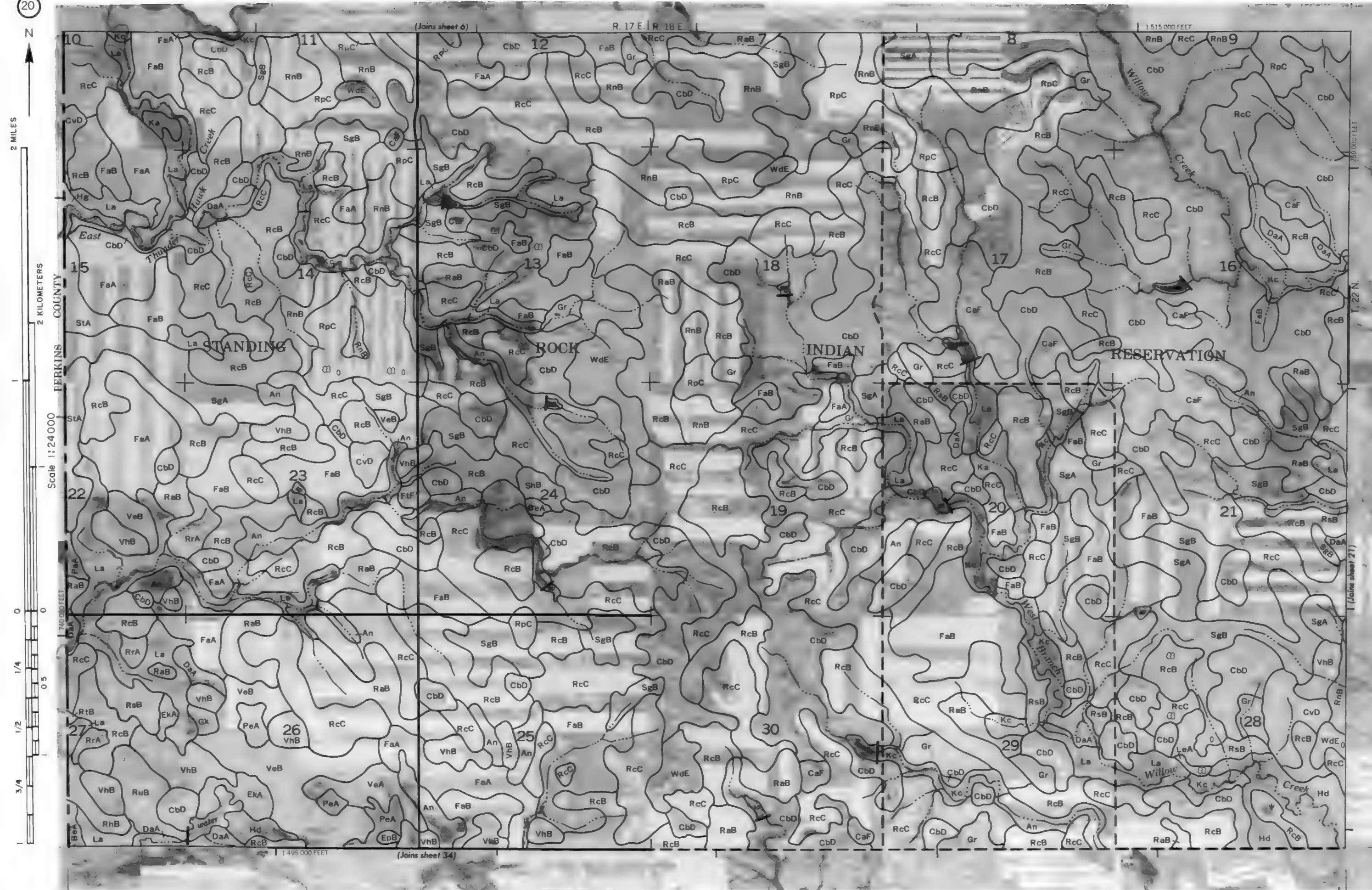
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140



CORSON COUNTY, SOUTH DAKOTA NO. 19
This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.







2 MILES

2 KILOMETERS

Scale 1:24 000

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1/2

3/4

1

1 1/2

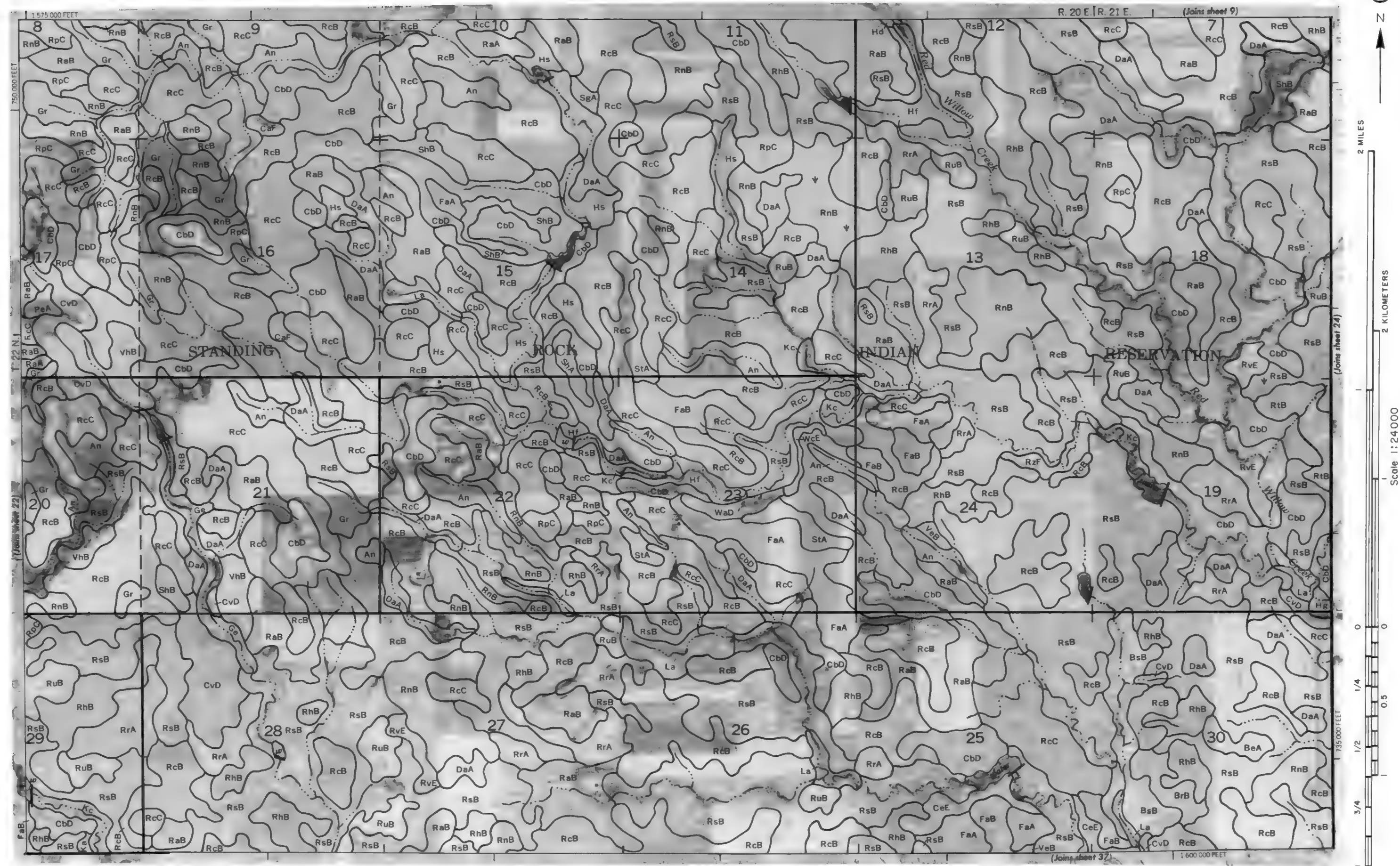
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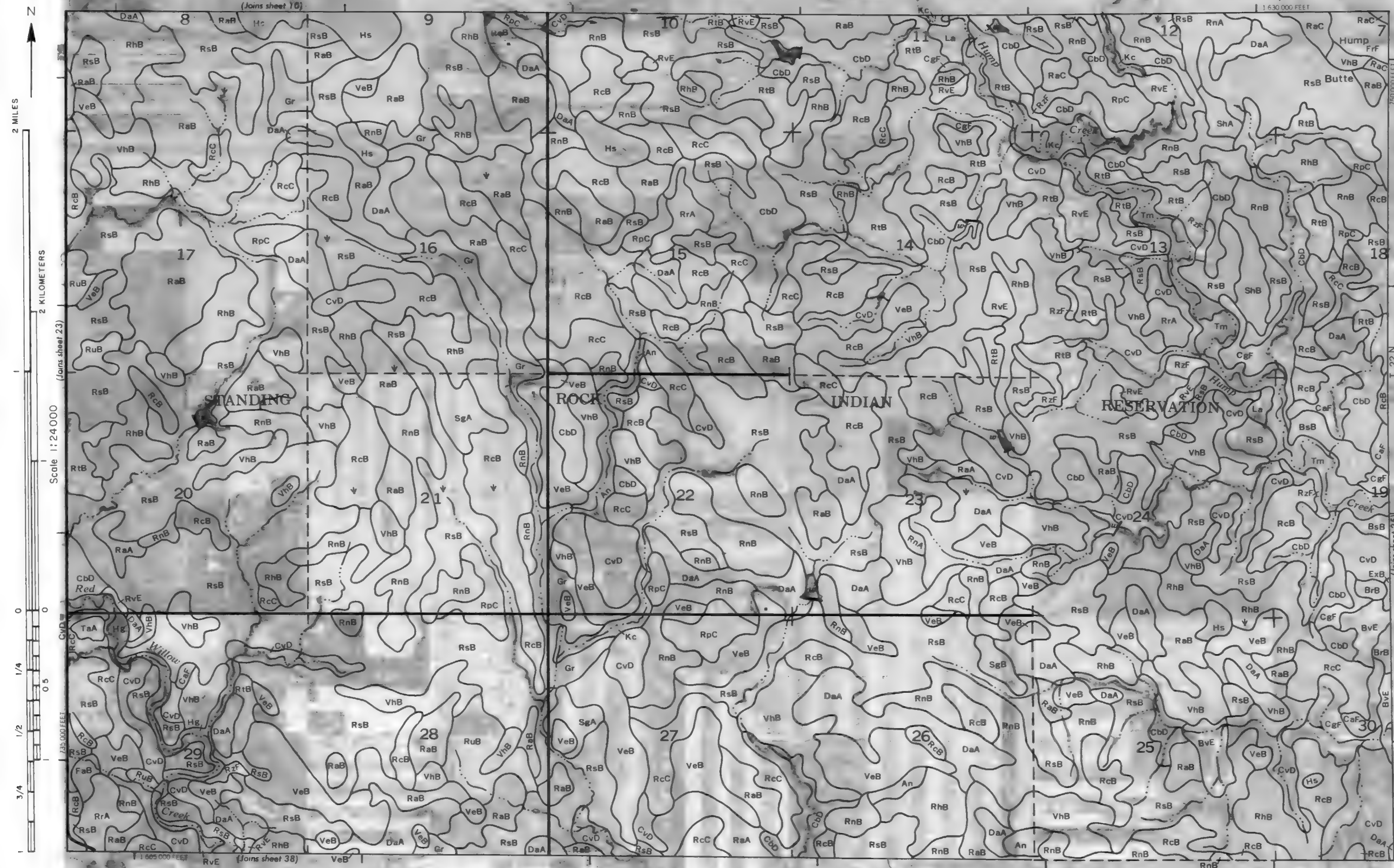
CORSON COUNTY, SOUTH DAKOTA NO. 21
This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximate; positioned.



CORSON COUNTY, SOUTH DAKOTA NO. 23



R. 21 E. | R. 22 E.
1 630 000 FEET

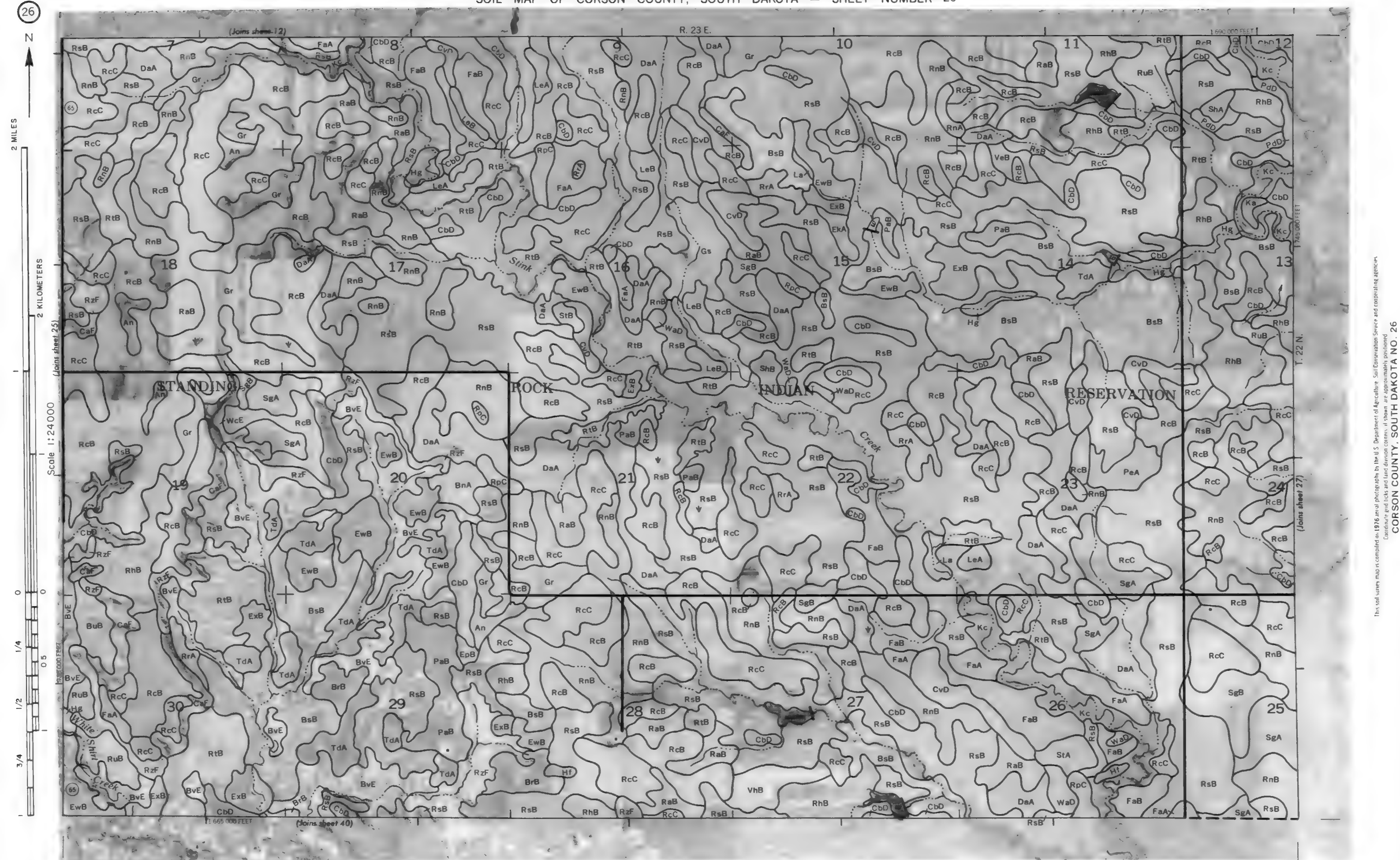


This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture. Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

ordinate grid ticks and land division corners, if shown, are approximately positioned

(bring about 24) !



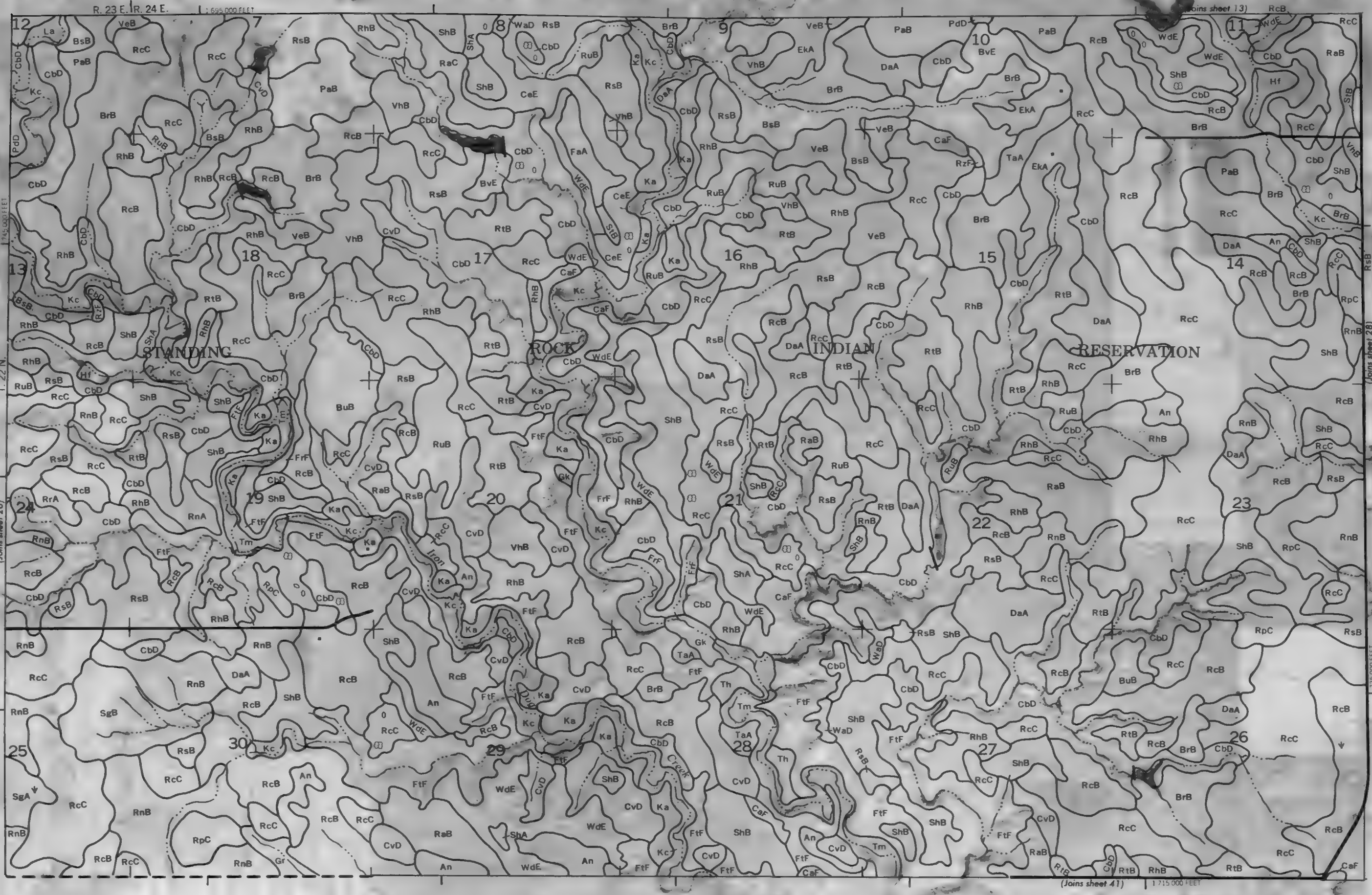




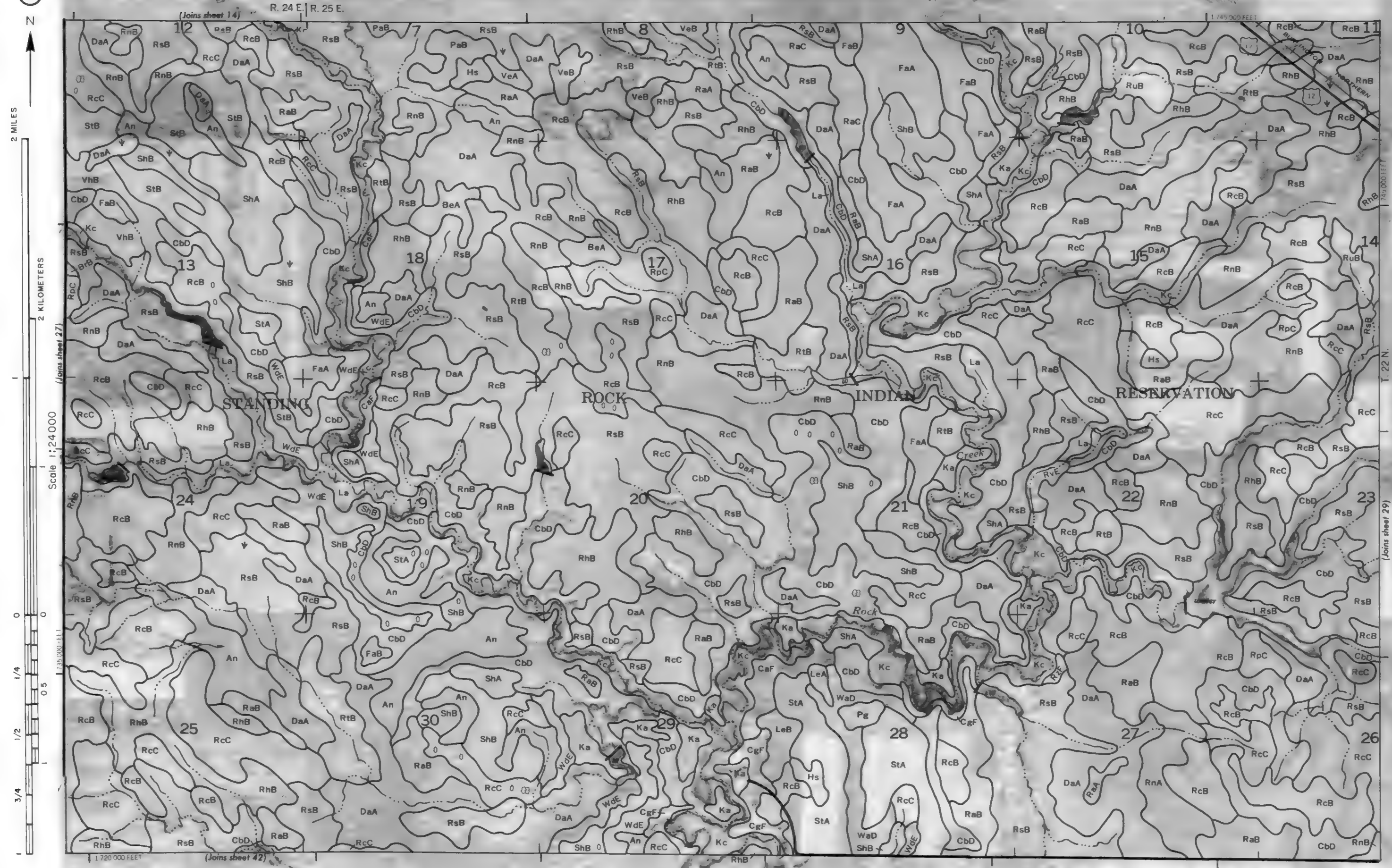
2 MILES

2 KILOMETERS

Scale 1:24,000



CORSON COUNTY, SOUTH DAKOTA NO. 27
 This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture Soil Conservation Service and cooperating agencies.
 Coordinate grid ticks and land division corners, if shown, are approximate; positioned.

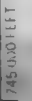


This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CORSON COUNTY, SOUTH DAKOTA NO. 28

CORSON COUNTY, SOUTH DAKOTA NO. 29
This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.





CORSON COUNTY, SOUTH DAKOTA NO. 30

CORSON COUNTY, SOUTH DAKOTA NO. 31

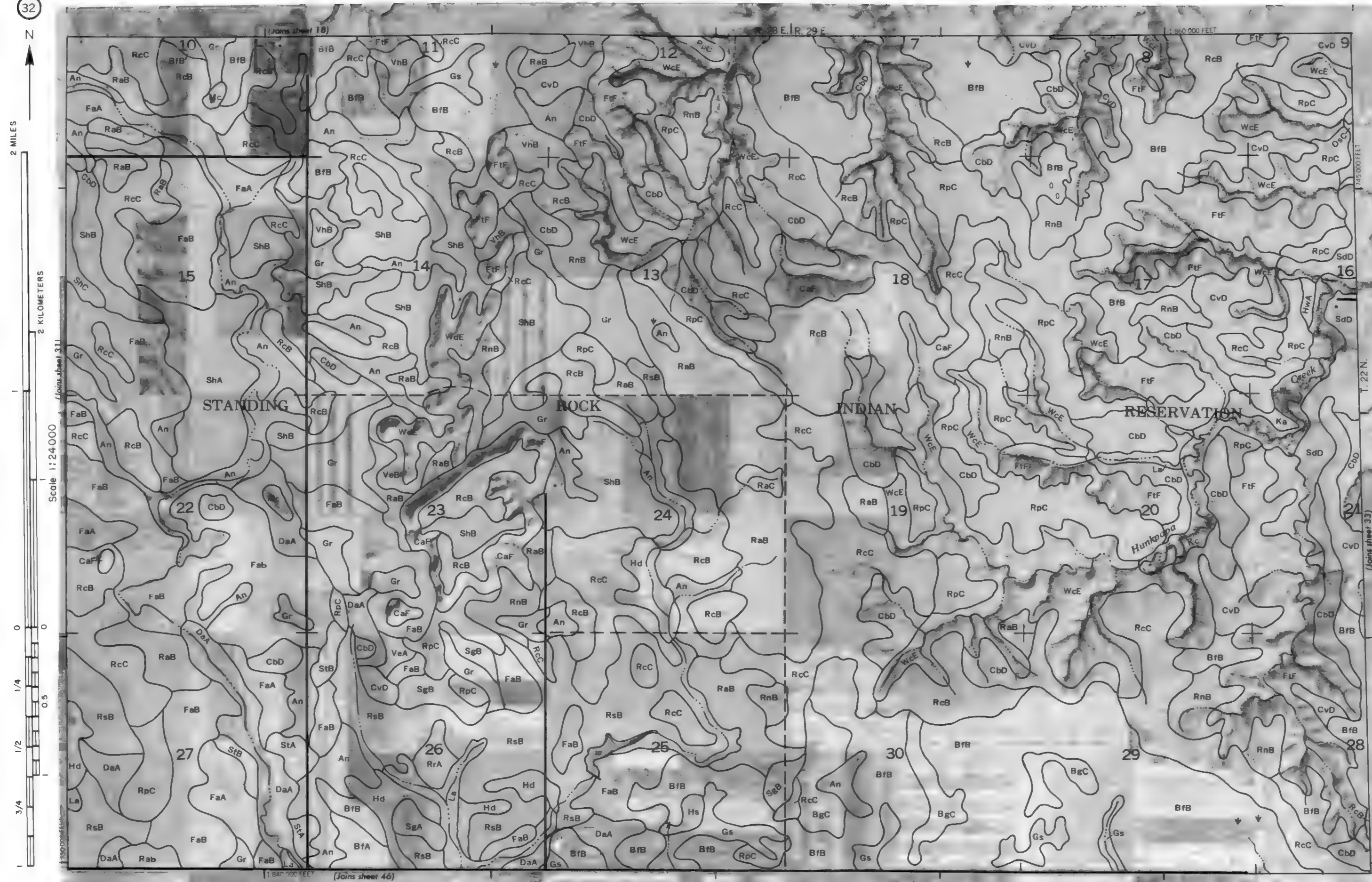
This soil survey map is compiled on 1976 aerial photographs by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners (shown) are approximately positioned.



2 MILES

2 KILOMETERS

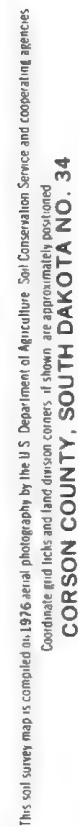
Scale 1:24,000



CORSON COUNTY, SOUTH DAKOTA NO. 33

This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximate, positioned







2 MILES

2 KILOMETERS

Scale 1:24,000



T. 21 N. | T. 22 N.

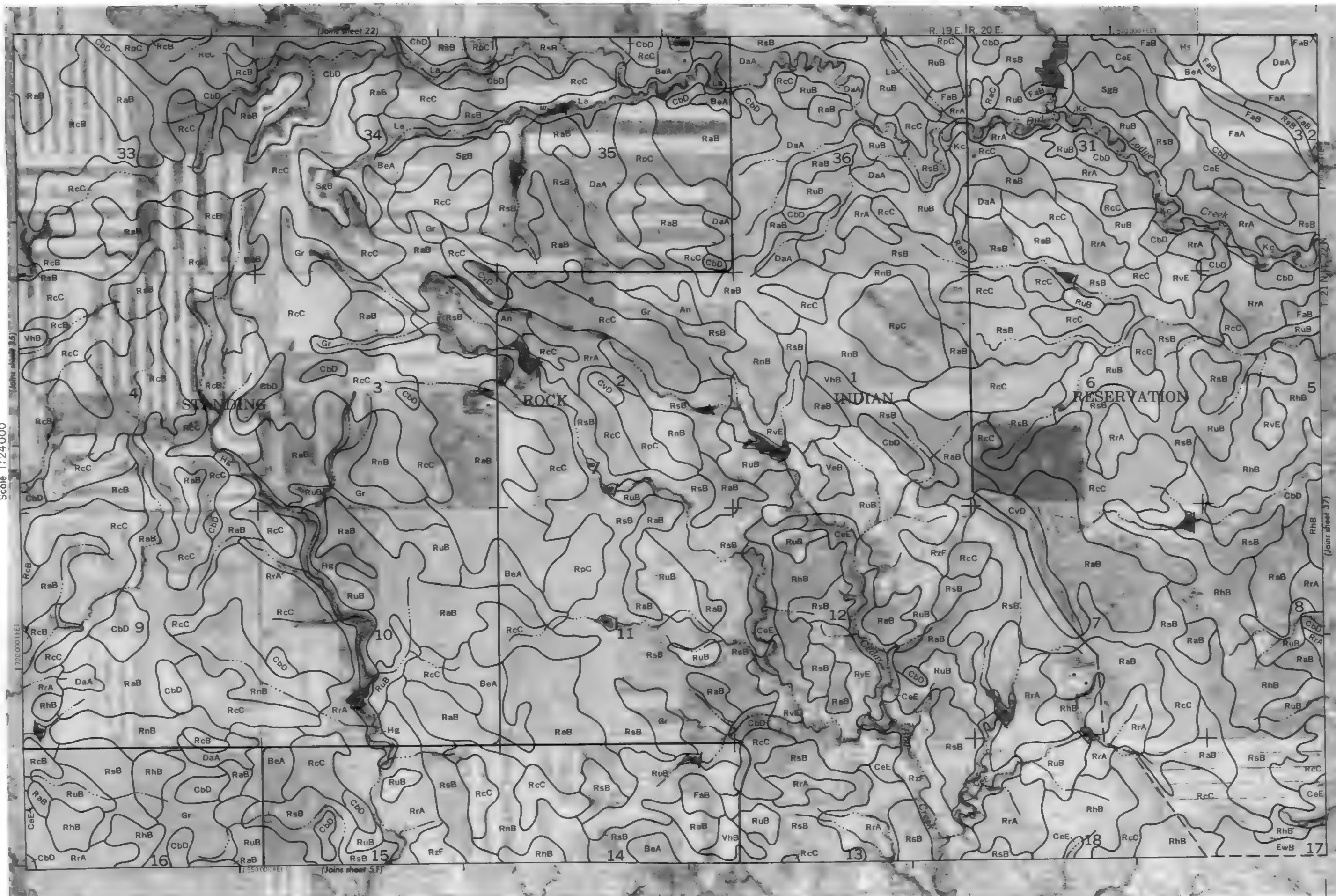
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(Joins sheet 21)

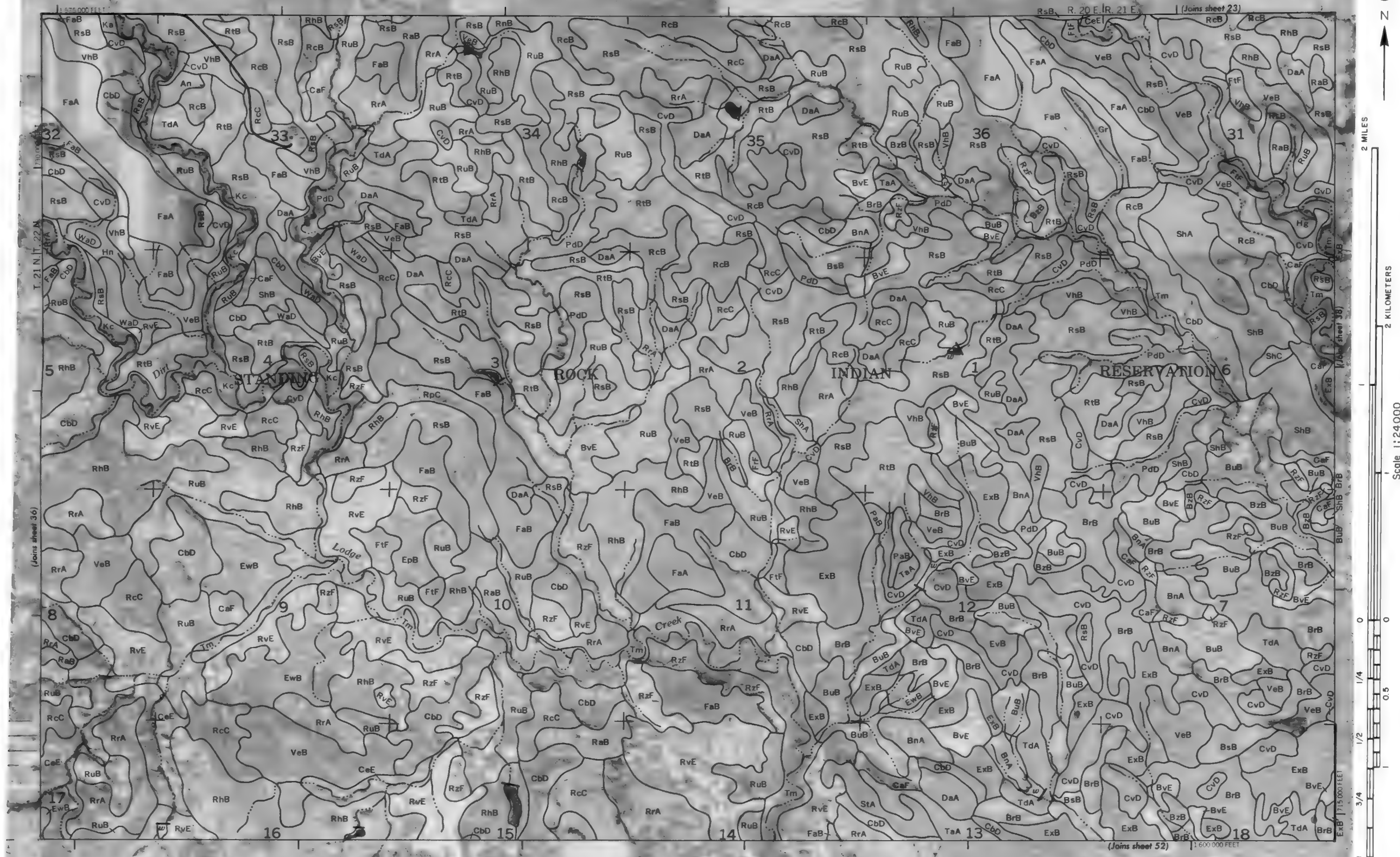
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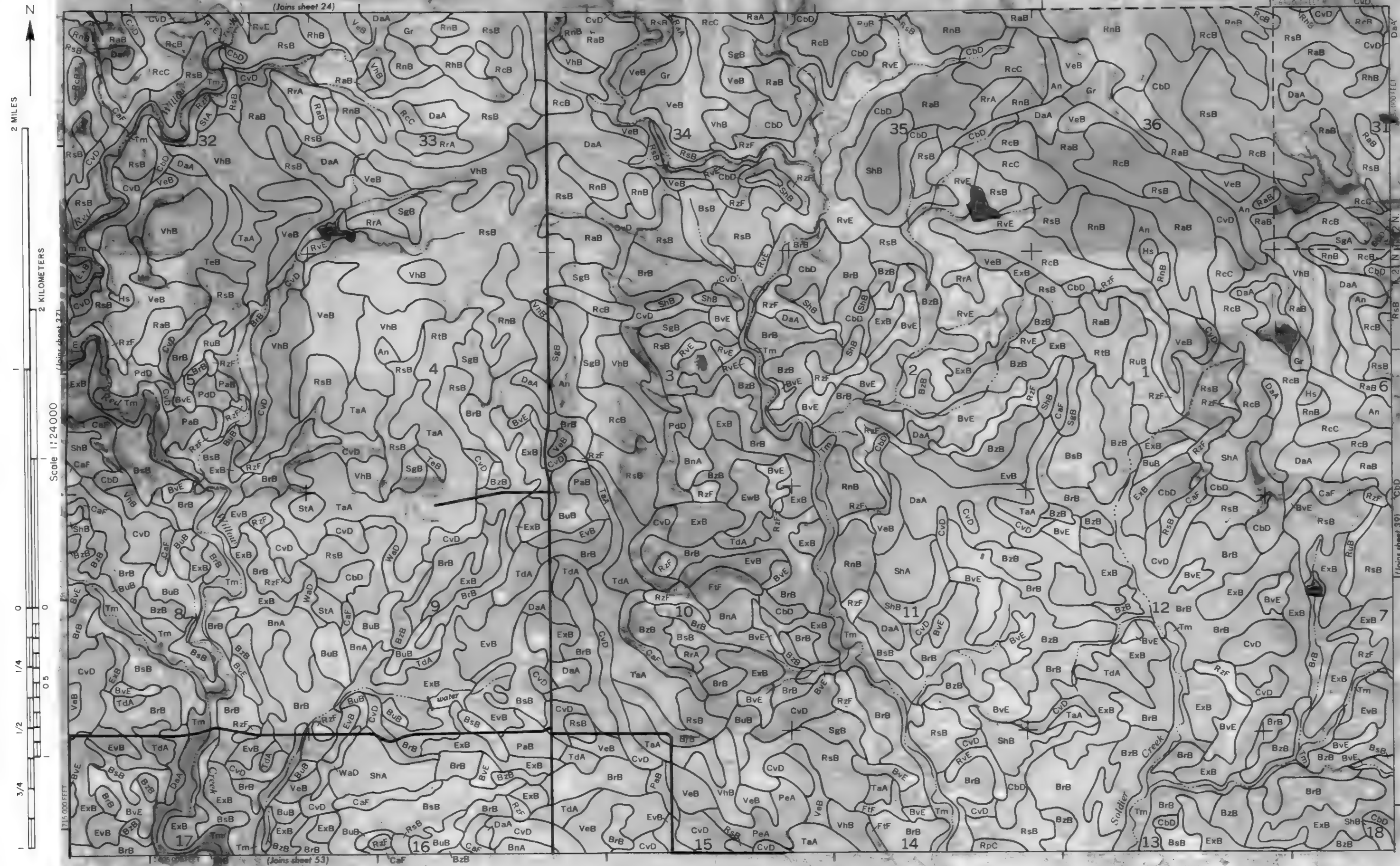
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This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture Soil Conservation Service and cooperating agencies.





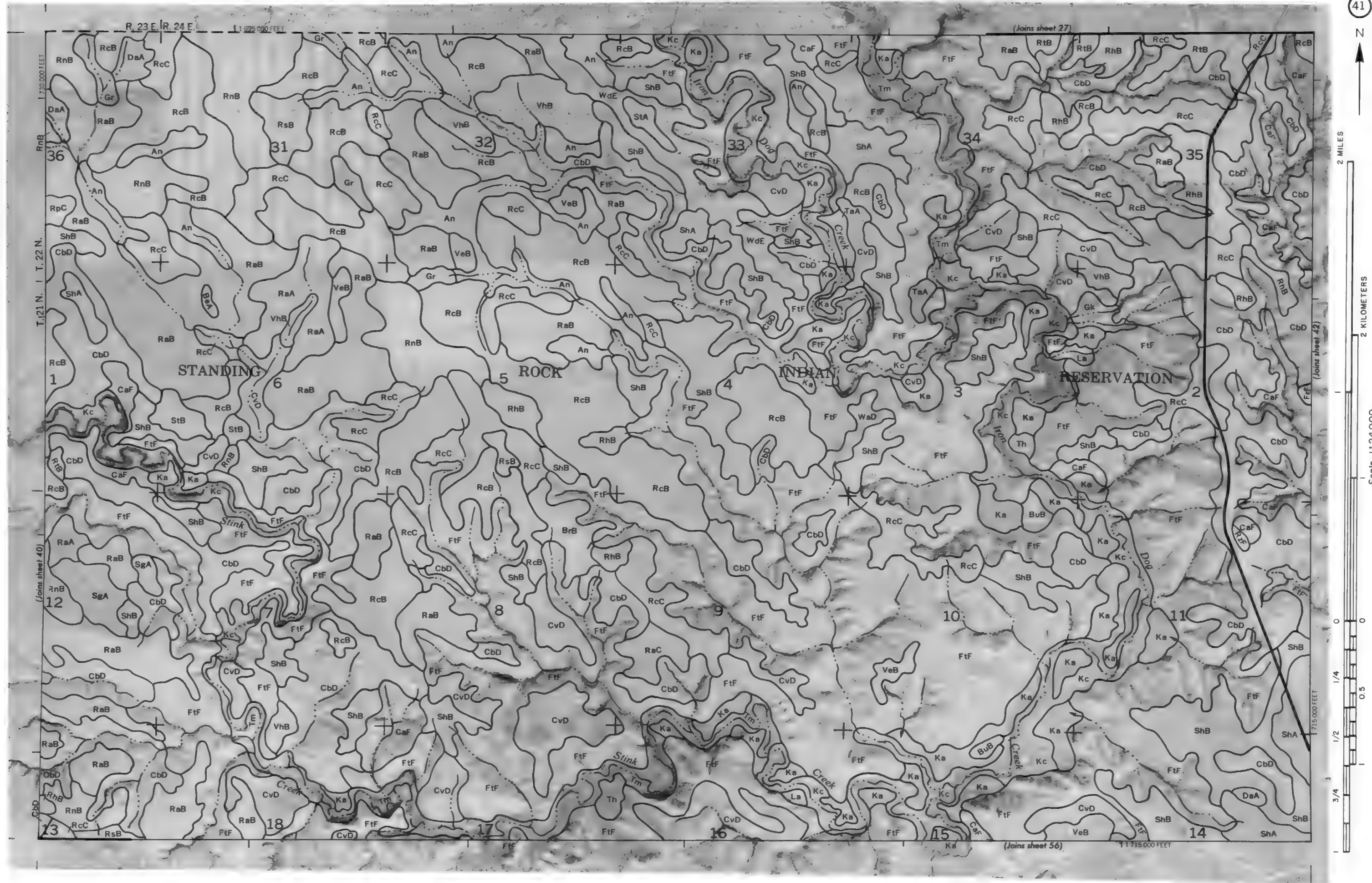
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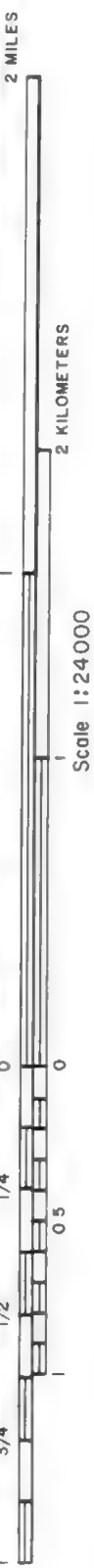


CORSON COUNTY, SOUTH DAKOTA NO. 40

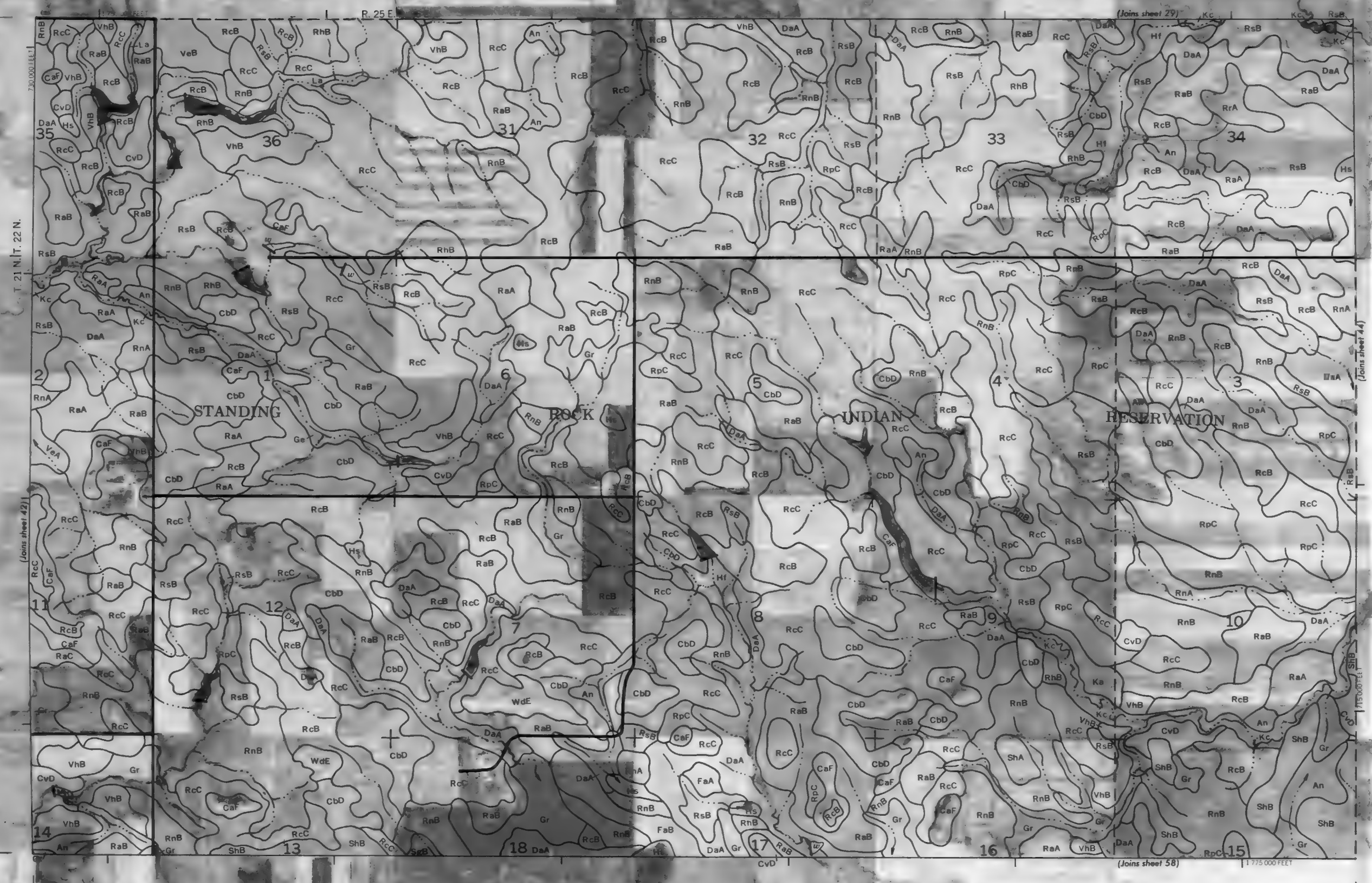
CORSON COUNTY, SOUTH DAKOTA NO. 41
This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.







CORSON COUNTY, SOUTH DAKOTA NO. 43
This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximate; positioned



2 MILES



2 KILOMETERS

Scale 1:24 000

(Join sheet 30)

(Join sheet 43)

(Join sheet 59)

(Join sheet 62)

(Join sheet 65)

(Join sheet 68)

(Join sheet 71)



1725000 FEET

T. 21 N. | T. 22 N.

R. 27 E. | R. 28 E.



2 MILES

2 KILOMETERS

Scale 1:24000



CORSON COUNTY, SOUTH DAKOTA NO. 45

This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners if shown are approximate; positioned.

T. 21 N. | T. 22 N.
125,000 FEET

(Joins sheet 34)

(Joins sheet 31)

(Joins sheet 46)

(Joins sheet 60)





[illegible]

Scale 1:24000





2 MILES

1 KILOMETERS

Scale 1:24,000

0

0

1/4

1/2

3/4

1

1 1/4

1 1/2

1 3/4

2

2 1/4

2 1/2

2 3/4

3

3 1/4

3 1/2

3 3/4

4

4 1/4

4 1/2

4 3/4

5

5 1/4

5 1/2

5 3/4

6

6 1/4

6 1/2

6 3/4

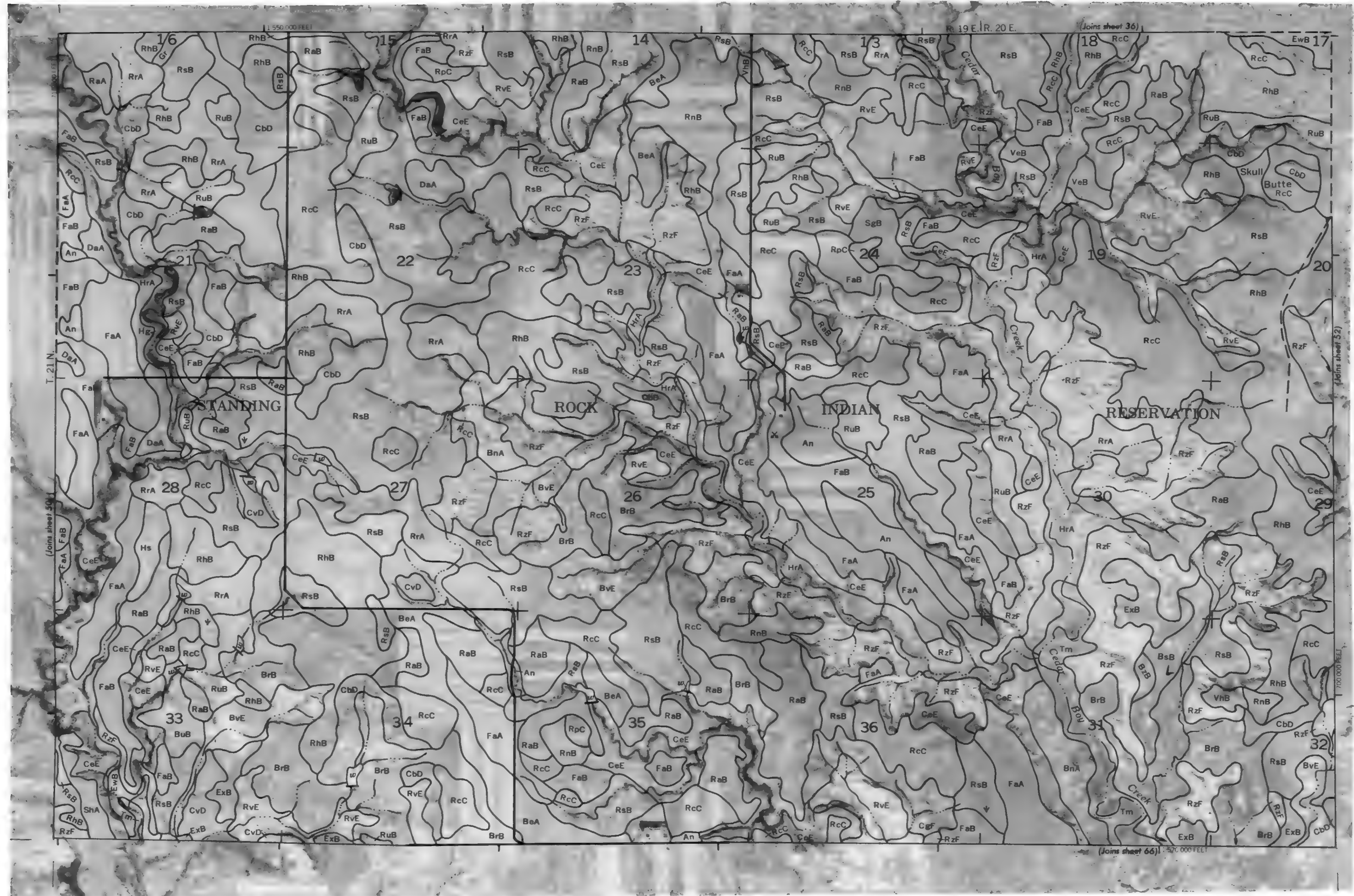
7



CORSON COUNTY, SOUTH DAKOTA NO. 49
This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



CORSON COUNTY, SOUTH DAKOTA NO. 51
This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners if shown are approximately positioned.



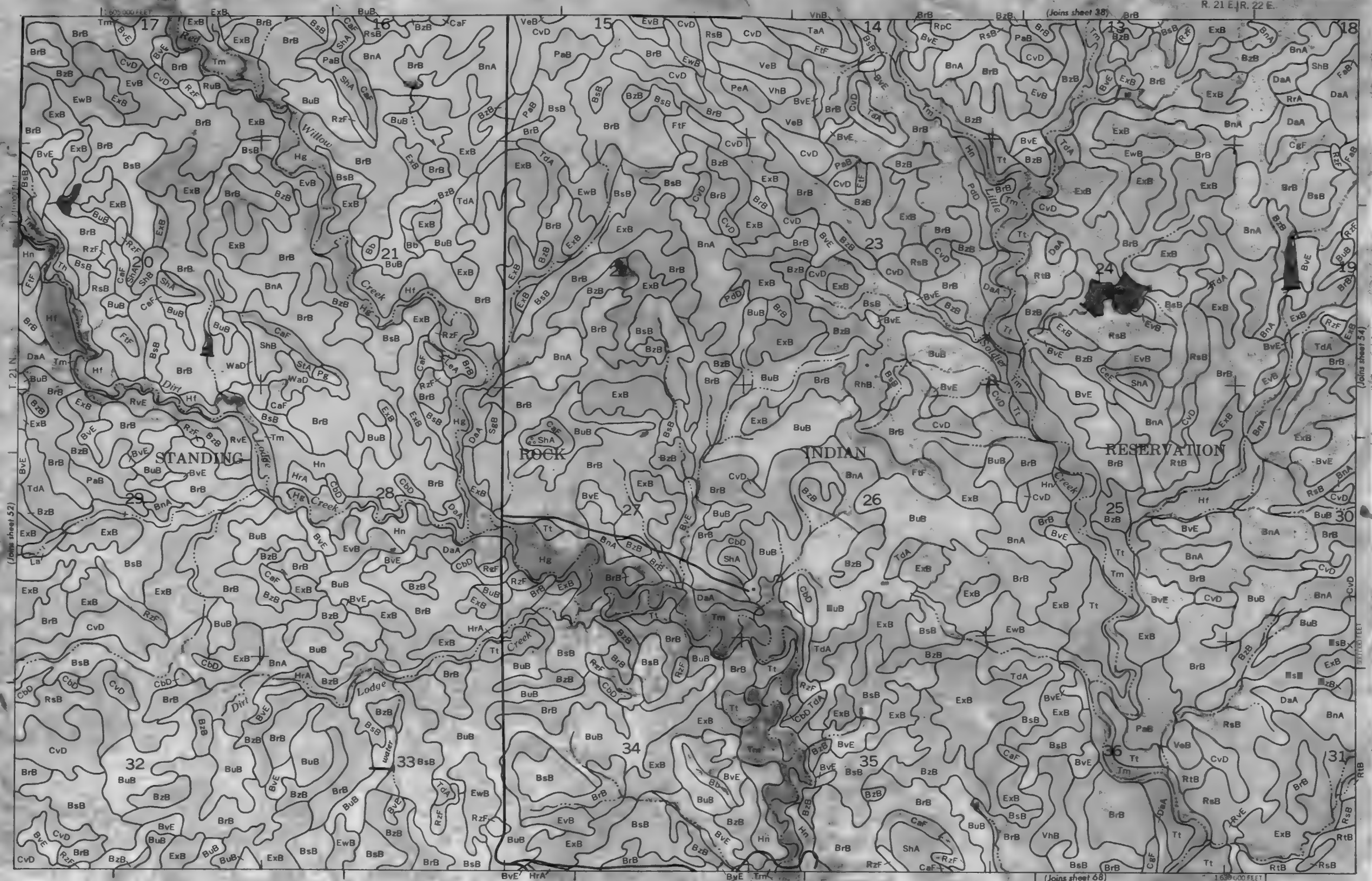




2 MILES

2 KILOMETERS

Scale 1:24000



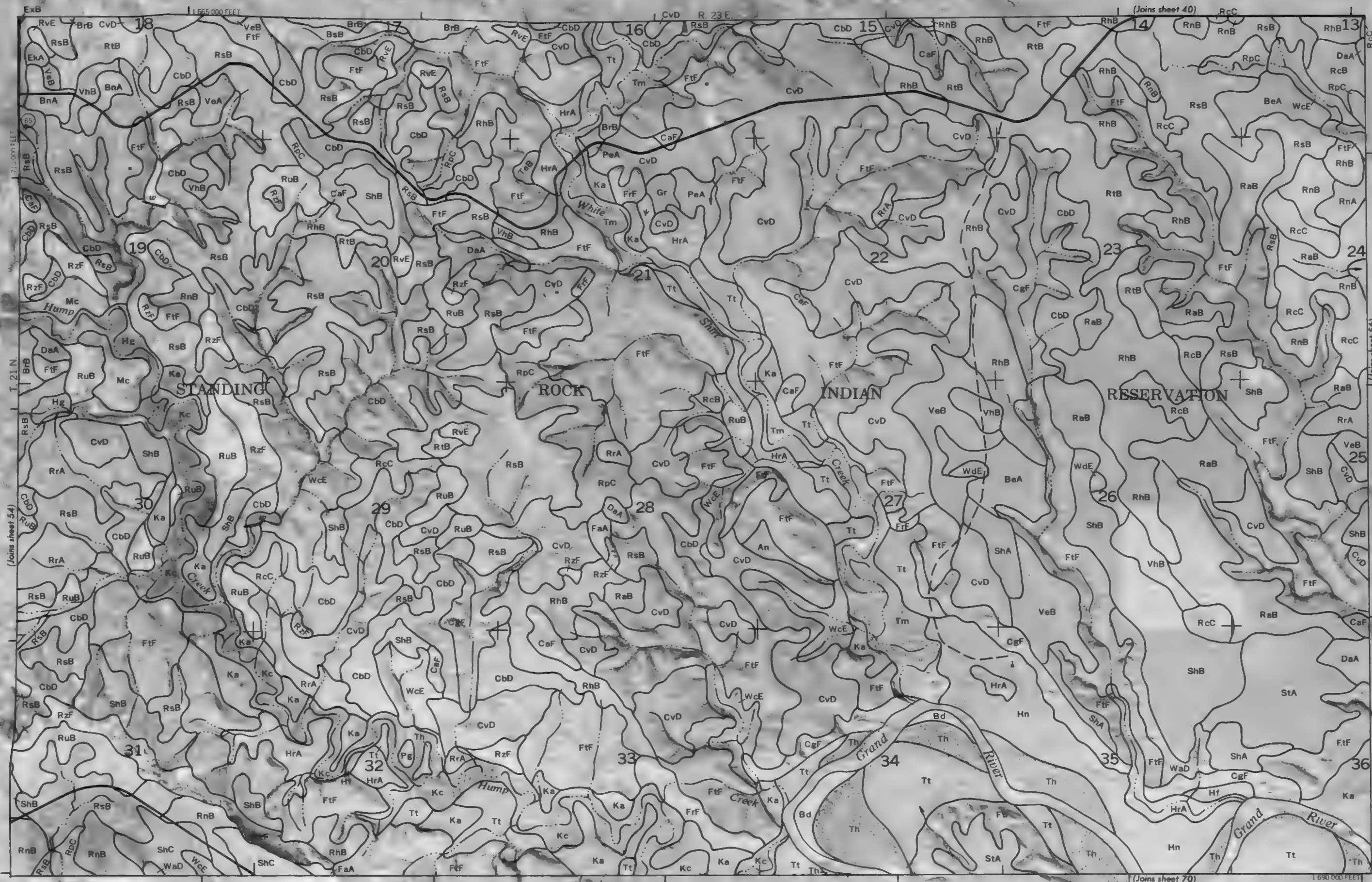
CORSON COUNTY, SOUTH DAKOTA NO. 53
This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This soil survey map is compiled from 1976 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid lines and land division corners, if shown, are approximately positioned.

CORSON COUNTY, SOUTH DAKOTA NO. 54

Joins sheet 54)



2 MILES

2 KILOMETERS

Scale 1: 24000



(Joins sheet 42)

2 MILES

2 KILOMETERS

Scale 1:24000

11

1/1

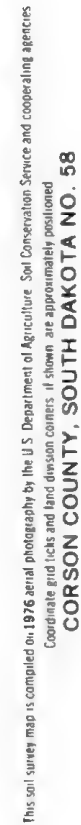
11

11

3

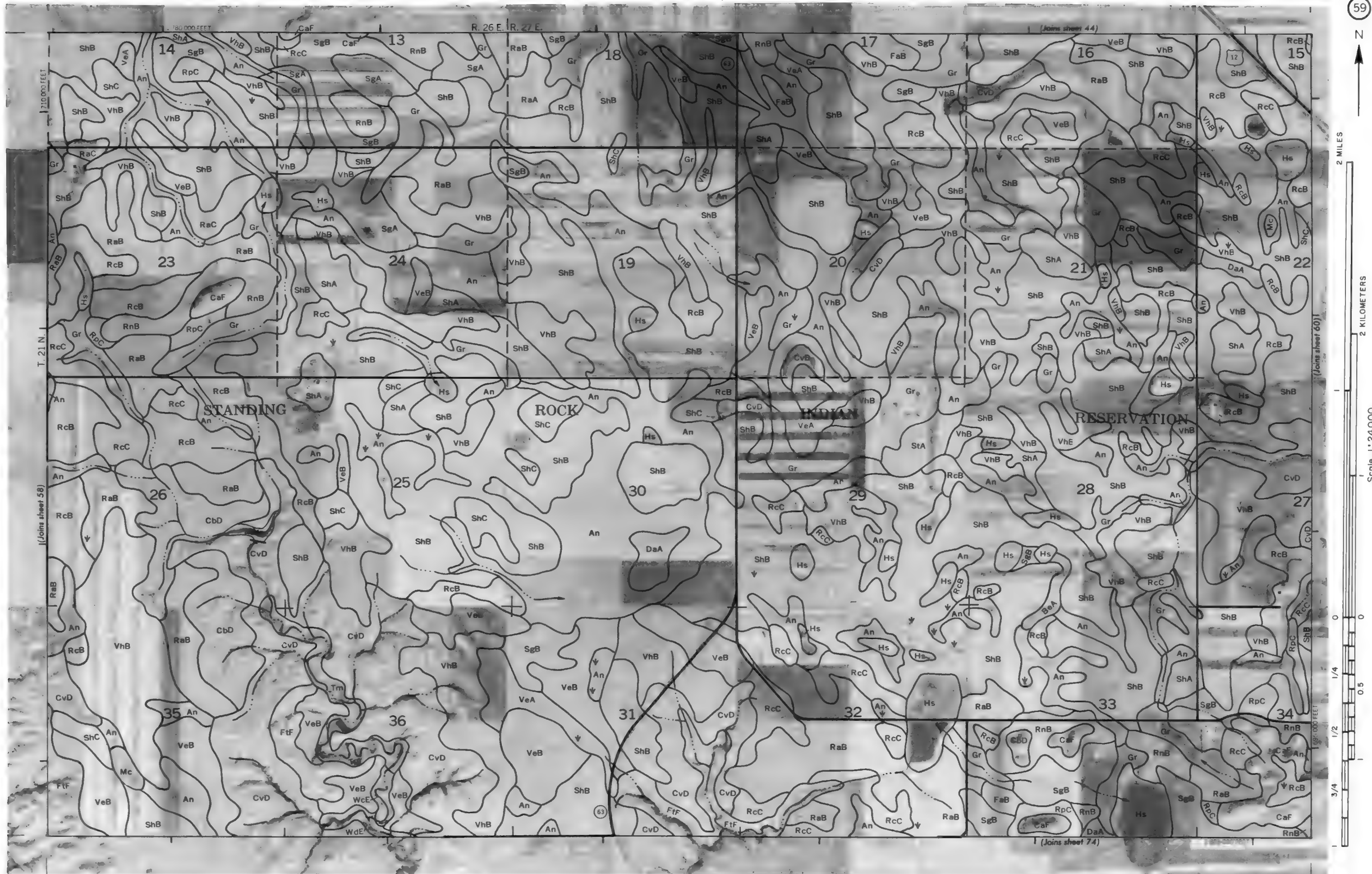
3

This is a detailed geological map of the Standing Rock Indian Reservation, North Dakota. The map is oriented with North at the top. It features a grid of section numbers (13-14, 15-16, 17-18, 19-20, 21-22, 23-24, 25-26, 27-28, 29-30, 31-32, 33-34, 35-36) and a coordinate system with Township 24 North and Range 25 East. The map shows the Grand River flowing through the western portion of the reservation. Various geological units are labeled with abbreviations such as ShA, ShB, ShC, ShD, ShE, ShF, ShG, ShH, ShI, ShJ, ShK, ShL, ShM, ShN, ShO, ShP, ShQ, ShR, ShS, ShT, ShU, ShV, ShW, ShX, ShY, ShZ, ShAA, ShAB, ShAC, ShAD, ShAE, ShAF, ShAG, ShAH, ShAI, ShAJ, ShAK, ShAL, ShAM, ShAN, ShAO, ShAP, ShAQ, ShAR, ShAS, ShAT, ShAU, ShAV, ShAW, ShAX, ShAY, ShAZ, ShBA, ShBB, ShBC, ShBD, ShBE, ShBF, ShBG, ShBH, ShBI, ShBJ, ShBK, ShBL, ShBM, ShBN, ShBO, ShBP, ShBQ, ShBR, ShBS, ShBT, ShBU, ShBV, ShBW, ShBX, ShBY, ShBZ, ShCA, ShCB, ShCC, ShCD, ShCE, ShCF, ShCG, ShCH, ShCI, ShCJ, ShCK, ShCL, ShCM, ShCN, ShCO, ShCP, ShCQ, ShCR, ShCS, ShCT, ShCU, ShCV, ShCW, ShCX, ShCY, ShCZ, ShDA, ShDB, ShDC, ShDD, ShDE, ShDF, ShDG, ShDH, ShDI, ShDJ, ShDK, ShDL, ShDM, ShDN, ShDO, ShDP, ShDQ, ShDR, ShDS, ShDT, ShDU, ShDV, ShDW, ShDX, ShDY, ShDZ, ShEA, ShEB, ShEC, ShED, ShEE, ShEF, ShEG, ShEH, ShEI, ShEJ, ShEK, ShEL, ShEM, ShEN, ShEO, ShEP, ShEQ, ShER, ShES, ShET, ShEU, ShEV, ShEW, ShEX, ShEY, ShEZ, ShFA, ShFB, ShFC, ShFD, ShFE, ShFF, ShFG, ShFH, ShFI, ShFJ, ShFK, ShFL, ShFM, ShFN, ShFO, ShFP, ShFQ, ShFR, ShFS, ShFT, ShFU, ShFV, ShFW, ShFX, ShFY, ShFZ, ShGA, ShGB, ShGC, ShGD, ShGE, ShGF, ShGG, ShGH, ShGI, ShGJ, ShGK, ShGL, ShGM, ShGN, ShGO, ShGP, ShGQ, ShGR, ShGS, ShGT, ShGU, ShGV, ShGW, ShGX, ShGY, ShGZ, ShHA, ShHB, ShHC, ShHD, ShHE, ShHF, ShHG, ShHH, ShHI, ShHJ, ShHK, ShHL, ShHM, ShHN, ShHO, ShHP, ShHQ, ShHR, ShHS, ShHT, ShHU, ShHV, ShHW, ShHX, ShHY, ShHZ, ShIA, ShIB, ShIC, ShID, ShIE, ShIF, ShIG, ShIH, ShIJ, ShIK, ShIL, ShIM, ShIN, ShIO, ShIP, ShIQ, ShIR, ShIS, ShIT, ShIU, ShIV, ShIW, ShIX, ShIY, ShIZ, ShJA, ShJB, ShJC, ShJD, ShJE, ShJF, ShJG, ShJH, ShJI, ShJJ, ShJK, ShJL, ShJM, ShJN, ShJO, ShJP, ShJQ, ShJR, ShJS, ShJT, ShJU, ShJV, ShJW, ShJX, ShJY, ShJZ, ShKA, ShKB, ShKC, ShKD, ShKE, ShKF, ShKG, ShKH, ShKI, ShKJ, ShKK, ShKL, ShKM, ShKN, ShKO, ShKP, ShKQ, ShKR, ShKS, ShKT, ShKU, ShKV, ShKW, ShKX, ShKY, ShKZ, ShLA, ShLB, ShLC, ShLD, ShLE, ShLF, ShLG, ShLH, ShLI, ShLJ, ShLK, ShLL, ShLM, ShLN, ShLO, ShLP, ShLQ, ShLR, ShLS, ShLT, ShLU, ShLV, ShLW, ShLX, ShLY, ShLZ, ShMA, ShMB, ShMC, ShMD, ShME, ShMF, ShMG, ShMH, ShMI, ShMJ, ShMK, ShML, ShMM, ShMN, ShMO, ShMP, ShMQ, ShMR, ShMS, ShMT, ShMU, ShMV, ShMW, ShMX, ShMY, ShMZ, ShNA, ShNB, ShNC, ShND, ShNE, ShNF, ShNG, ShNH, ShNI, ShNJ, ShNK, ShNL, ShNM, ShNN, ShNO, ShNP, ShNQ, ShNR, ShNS, ShNT, ShNU, ShNV, ShNW, ShNX, ShNY, ShNZ, ShOA, ShOB, ShOC, ShOD, ShOE, ShOF, ShOG, ShOH, ShOI, ShOJ, ShOK, ShOL, ShOM, ShON, ShOO, ShOP, ShOQ, ShOR, ShOS, ShOT, ShOU, ShOV, ShOW, ShOX, ShOY, ShOZ, ShPA, ShPB, ShPC, ShPD, ShPE, ShPF, ShPG, ShPH, ShPI, ShPJ, ShPK, ShPL, ShPM, ShPN, ShPO, ShPP, ShPQ, ShPR, ShPS, ShPT, ShPU, ShPV, ShPW, ShPX, ShPY, ShPZ, ShQA, ShQB, ShQC, ShQD, ShQE, ShQF, ShQG, ShQH, ShQI, ShQJ, ShQK, ShQL, ShQM, ShQN, ShQO, ShQP, ShQQ, ShQR, ShQS, ShQT, ShQU, ShQV, ShQW, ShQX, ShQY, ShQZ, ShRA, ShRB, ShRC, ShRD, ShRE, ShRF, ShRG, ShRH, ShRI, ShRJ, ShRK, ShRL, ShRM, ShRN, ShRO, ShRP, ShRQ, ShRR, ShRS, ShRT, ShRU, ShRV, ShRW, ShRX, ShRY, ShRZ, ShSA, ShSB, ShSC, ShSD, ShSE, ShSF, ShSG, ShSH, ShSI, ShSJ, ShSK, ShSL, ShSM, ShSN, ShSO, ShSP, ShSQ, ShSR, ShSS, ShST, ShSU, ShSV, ShSW, ShSX, ShSY, ShSZ, ShTA, ShTB, ShTC, ShTD, ShTE, ShTF, ShTG, ShTH, ShTI, ShTJ, ShTK, ShTL, ShTM, ShTN, ShTO, ShTP, ShTQ, ShTR, ShTS, ShTT, ShTU, ShTV, ShTW, ShTX, ShTY, ShTZ, ShUA, ShUB, ShUC, ShUD, ShUE, ShUF, ShUG, ShUH, ShUI, ShUJ, ShUK, ShUL, ShUM, ShUN, ShUO, ShUP, ShUQ, ShUR, ShUS, ShUT, ShUU, ShUV, ShUW, ShUX, ShUY, ShUZ, ShVA, ShVB, ShVC, ShVD, ShVE, ShVF, ShVG, ShVH, ShVI, ShVJ, ShVK, ShVL, ShVM, ShVN, ShVO, ShVP, ShVQ, ShVR, ShVS, ShVT, ShVU, ShVV, ShVW, ShVX, ShVY, ShVZ, ShWA, ShWB, ShWC, ShWD, ShWE, ShWF, ShWG, ShWH, ShWI, ShWJ, ShWK, ShWL, ShWM, ShWN, ShWO, ShWP, ShWQ, ShWR, ShWS, ShWT, ShWU, ShWV, ShWW, ShWX, ShWY, ShWZ, ShXA, ShXB, ShXC, ShXD, ShXE, ShXF, ShXG, ShXH, ShXI, ShXJ, ShXK, ShXL, ShXM, ShXN, ShXO, ShXP, ShXQ, ShXR, ShXS, ShXT, ShXU, ShXV, ShXW, ShXX, ShXY, ShXZ, ShYA, ShYB, ShYC, ShYD, ShYE, ShYF, ShYG, ShYH, ShYI, ShYJ, ShYK, ShYL, ShYM, ShYN, ShYO, ShYP, ShYQ, ShYR, ShYS, ShYT, ShYU, ShYV, ShYW, ShYX, ShYY, ShYZ, ShZA, ShZB, ShZC, ShZD, ShZE, ShZF, ShZG, ShZH, ShZI, ShZJ, ShZK, ShZL, ShZM, ShZN, ShZO, ShZP, ShZQ, ShZR, ShZS, ShZT, ShZU, ShZV, ShZW, ShZX, ShZY, ShZZ.



This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture. Soil Conservation Service and cooperating agencies.

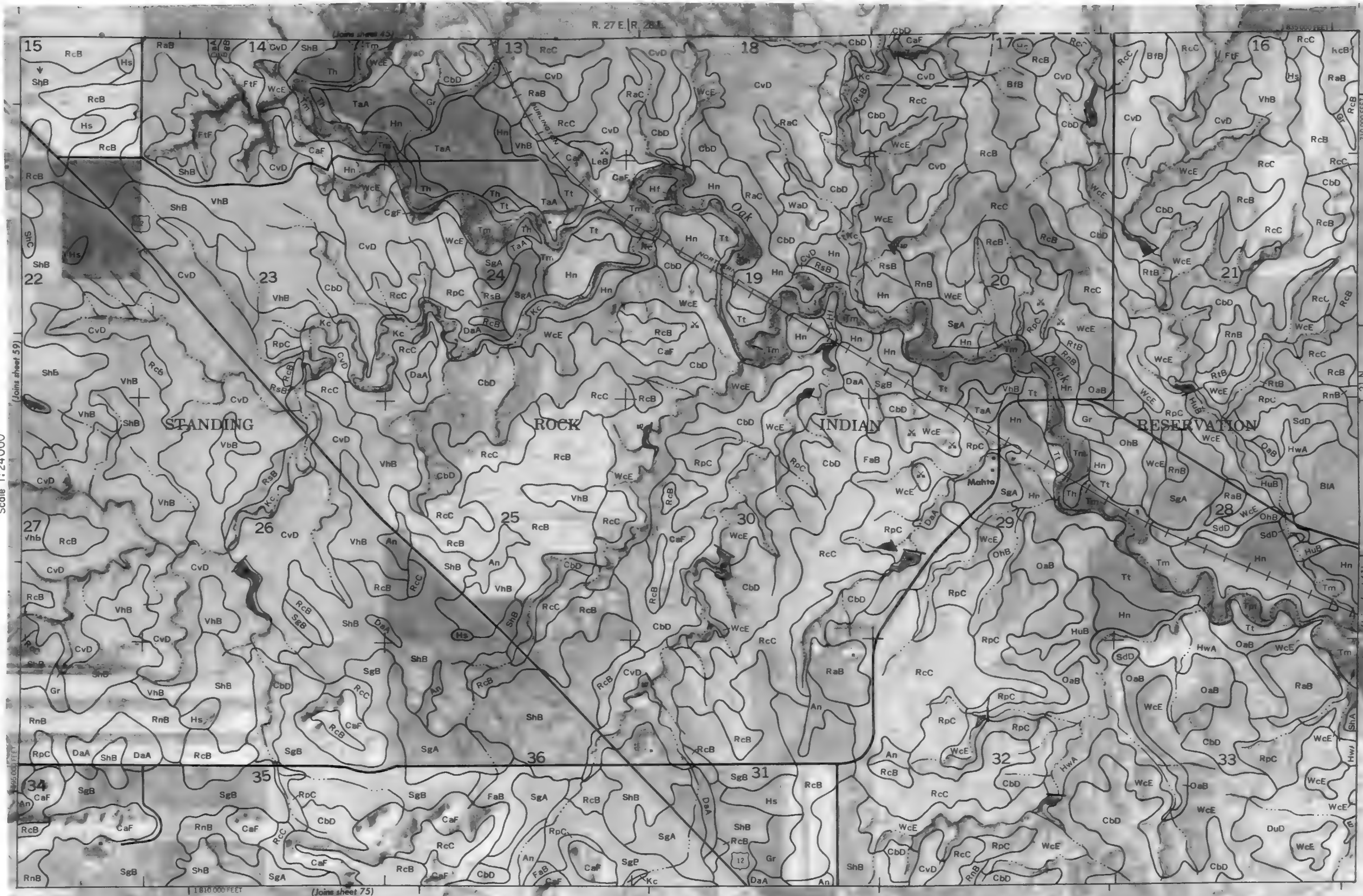
Coordinate grid ticks and land division corners if shown are approximately positioned



2 MILES

2 KILOMETERS

Scale 1:24,000



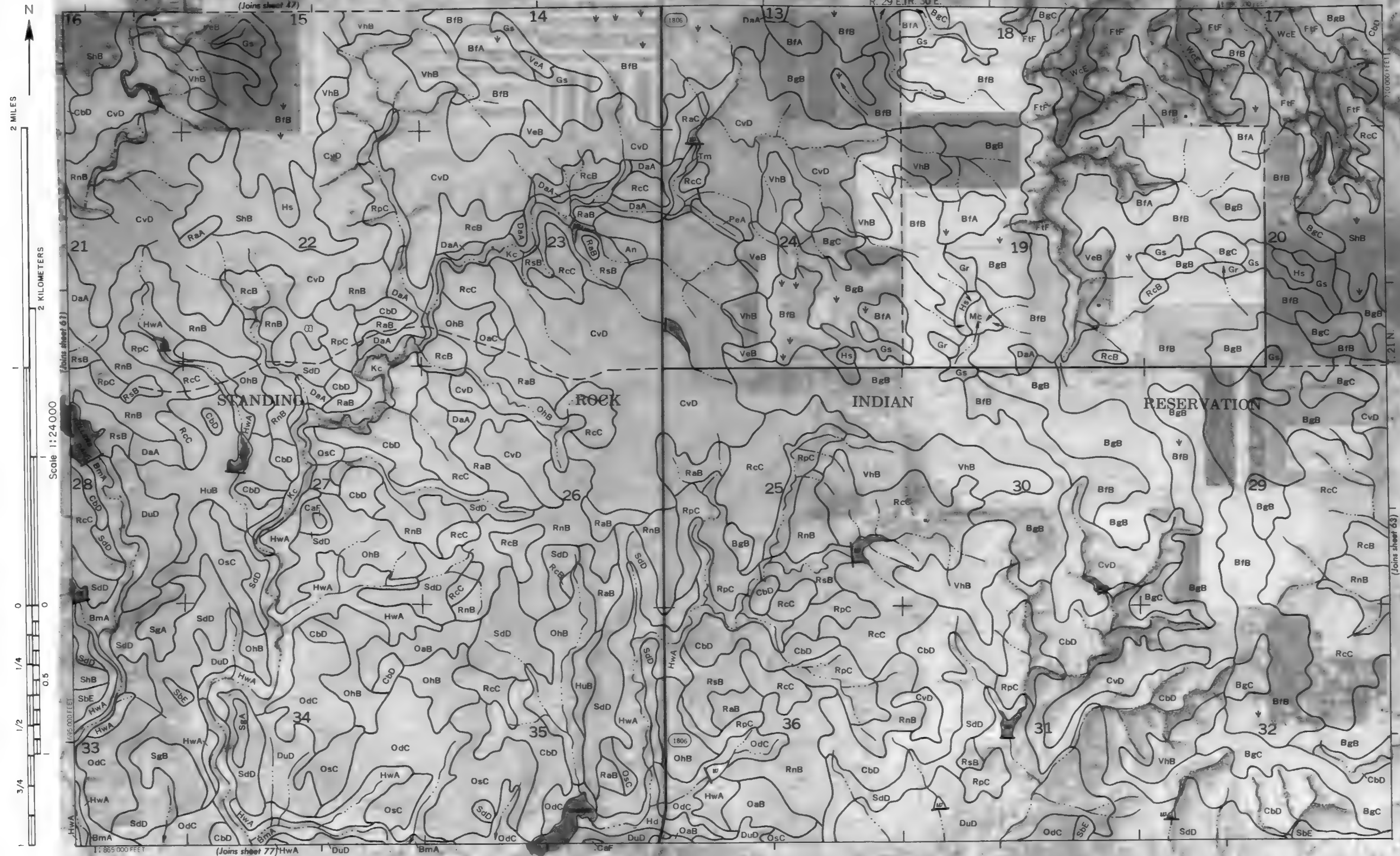
710 000 FEET

1:21 N.

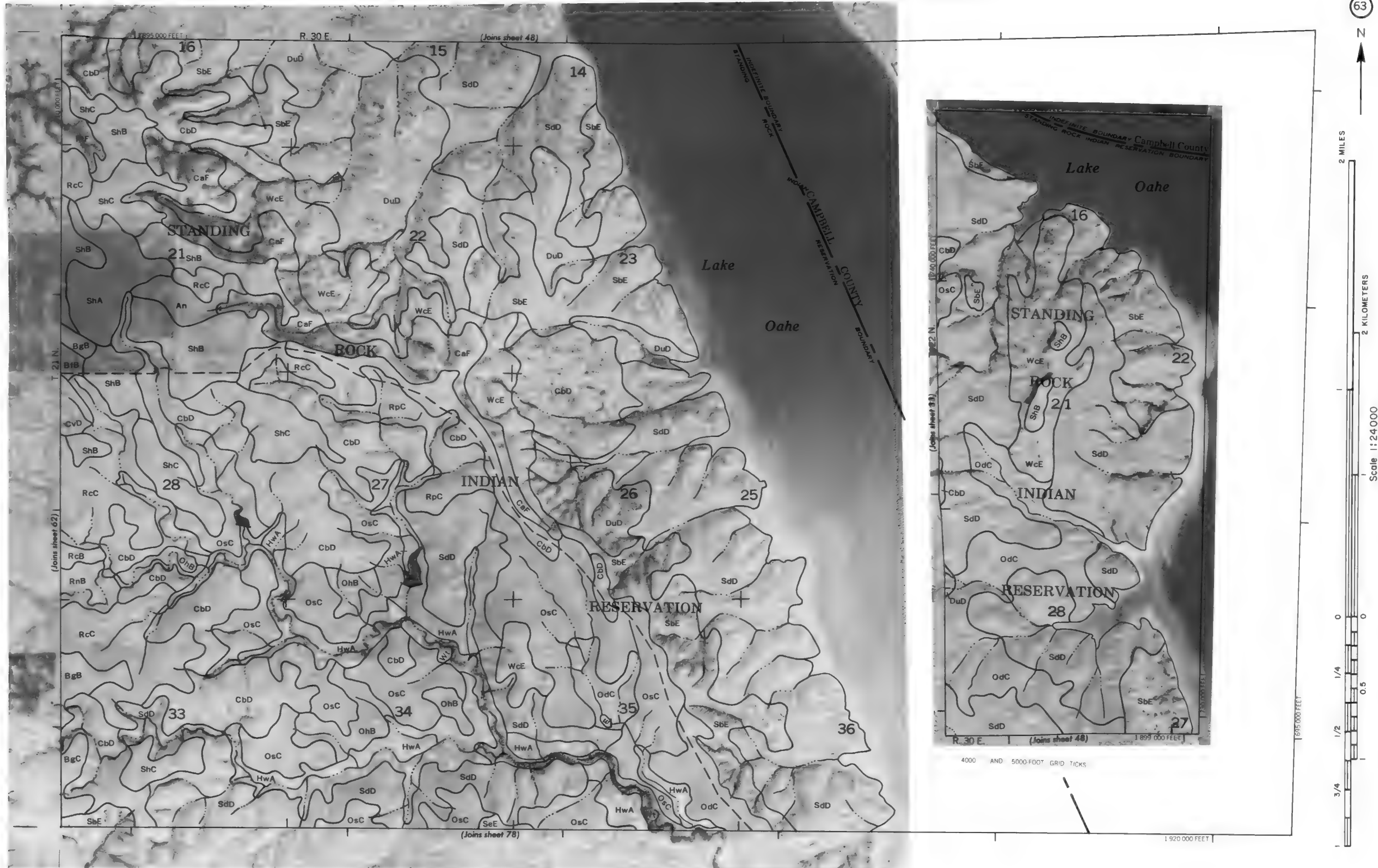
(Joins sheet 61)

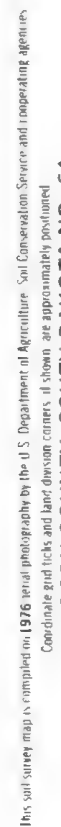
This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture. Soil Conservation Service and cooperating agencies.





CORSON COUNTY, SOUTH DAKOTA NO. 63
This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.





(Join sheet 50)

2 MILES

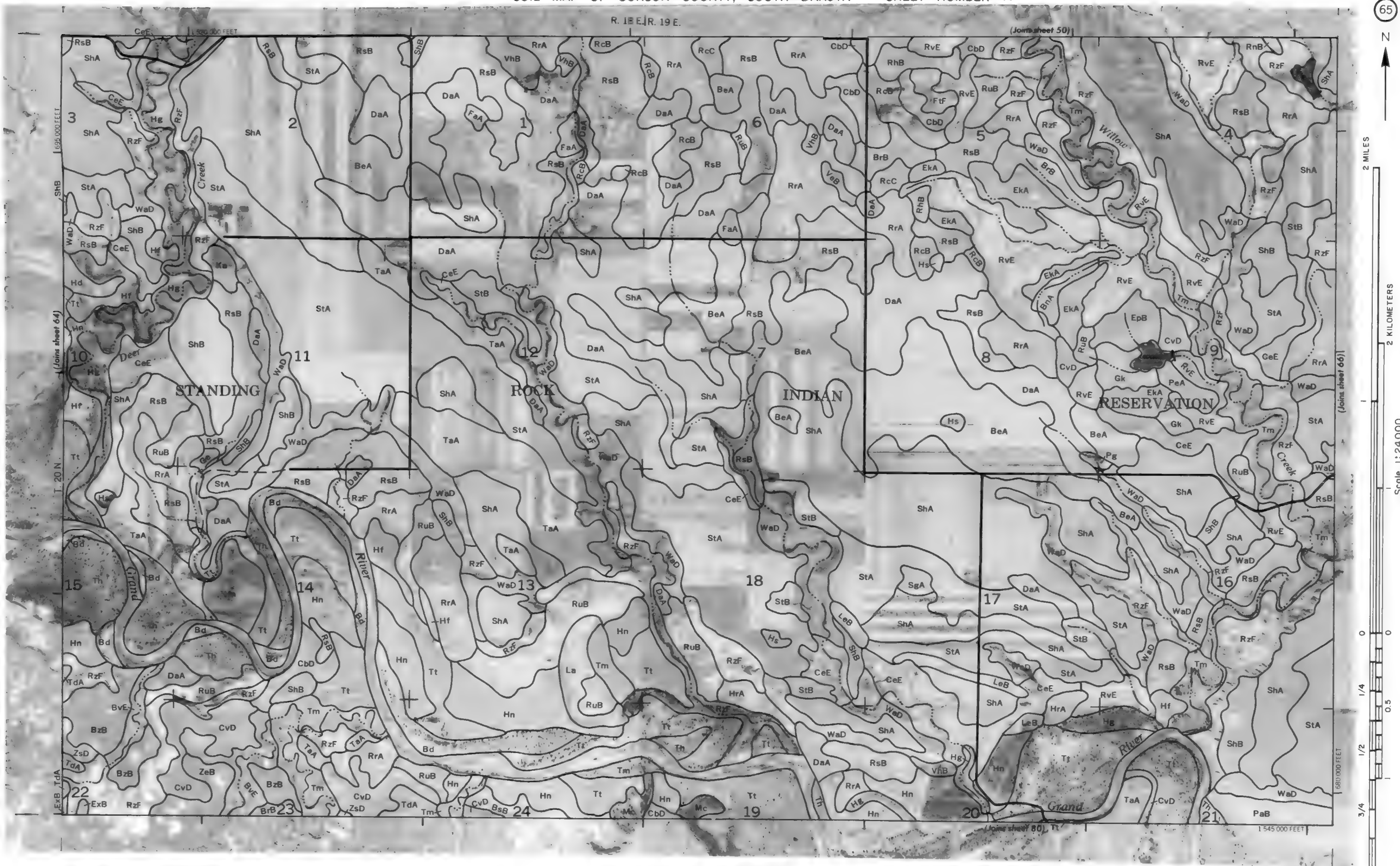
2 KILOMETERS

Scale 1:24000

0

0.5

This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture Soil Conservation Service and cooperating agencies. Coordinate grid lines and land district corner of Dakota are apparent on the map.





1976-1977









CORSON COUNTY, SOUTH DAKOTA NO. 71

This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture Soil Conservation Service and is for general reference only. It is not to be used for legal purposes. Soil names are given in the legend. Soil names are given in the legend. Soil names are given in the legend.



2 MILES

2 KILOMETERS

Scale 1:24,000



(Joins sheet 58)



This soil survey map is compiled from 1976 aerial photography by the U.S. Department of Agriculture Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



CORSON COUNTY, SOUTH DAKOTA NO. 75

This air survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture Soil Conservation Service and cooperating agencies. Contour, water, and other features shown are approximately positioned.



2 KILOMETERS

Scale 1:24,000



1101

Scale 1:24000

C

1/4	
-----	--

1/2

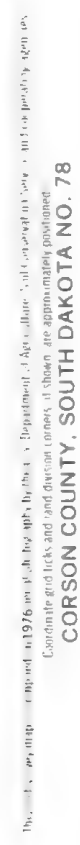
1/4

11

Thompson, 1976) and, as a by-product, the settlement of 4,000 million birds in 1975 and 1976 may have been a

CORSON COUNTY, SOUTH DAKOTA NO. 76







This soil survey map was compiled on 1976 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.



This is a view map - compiled in 1976 aerial photography by the U.S. Department of Agriculture Soil Conservation Service and cooperating agencies. Good native grass and large deciduous groves of hickory are apparently preserved.

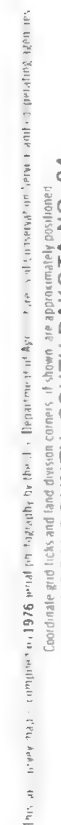


0
0
L
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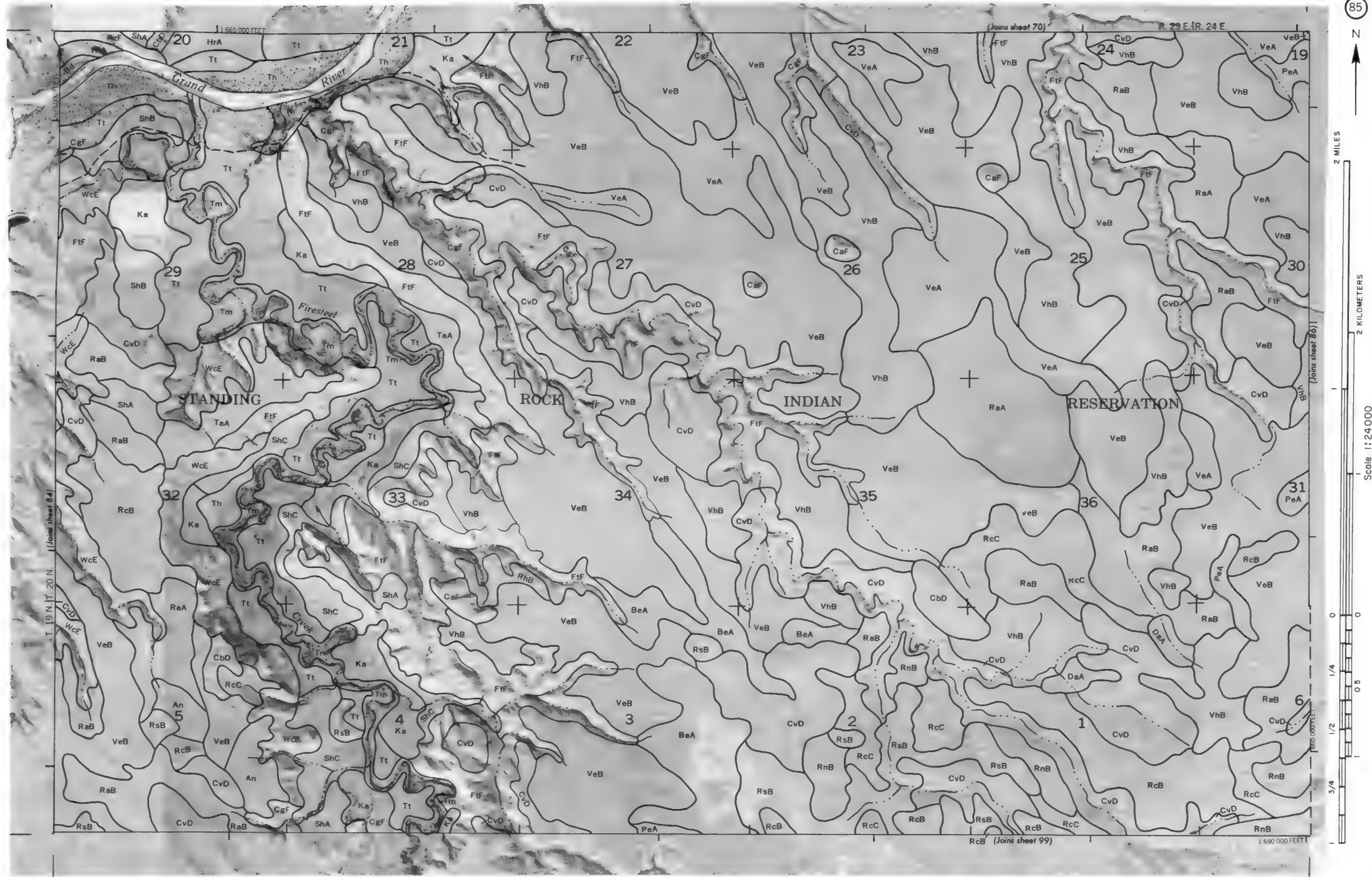
—







This is a reprint compiled in 1976 aerial photography by the U.S. Department of Agriculture Soil Conservation Service and copyright 1976 by the U.S. Department of Agriculture.





(Join sheet 86)







2 MILES

2 KILOMETERS

Scale 1:24 000

0 1/4 1/2 3/4 1

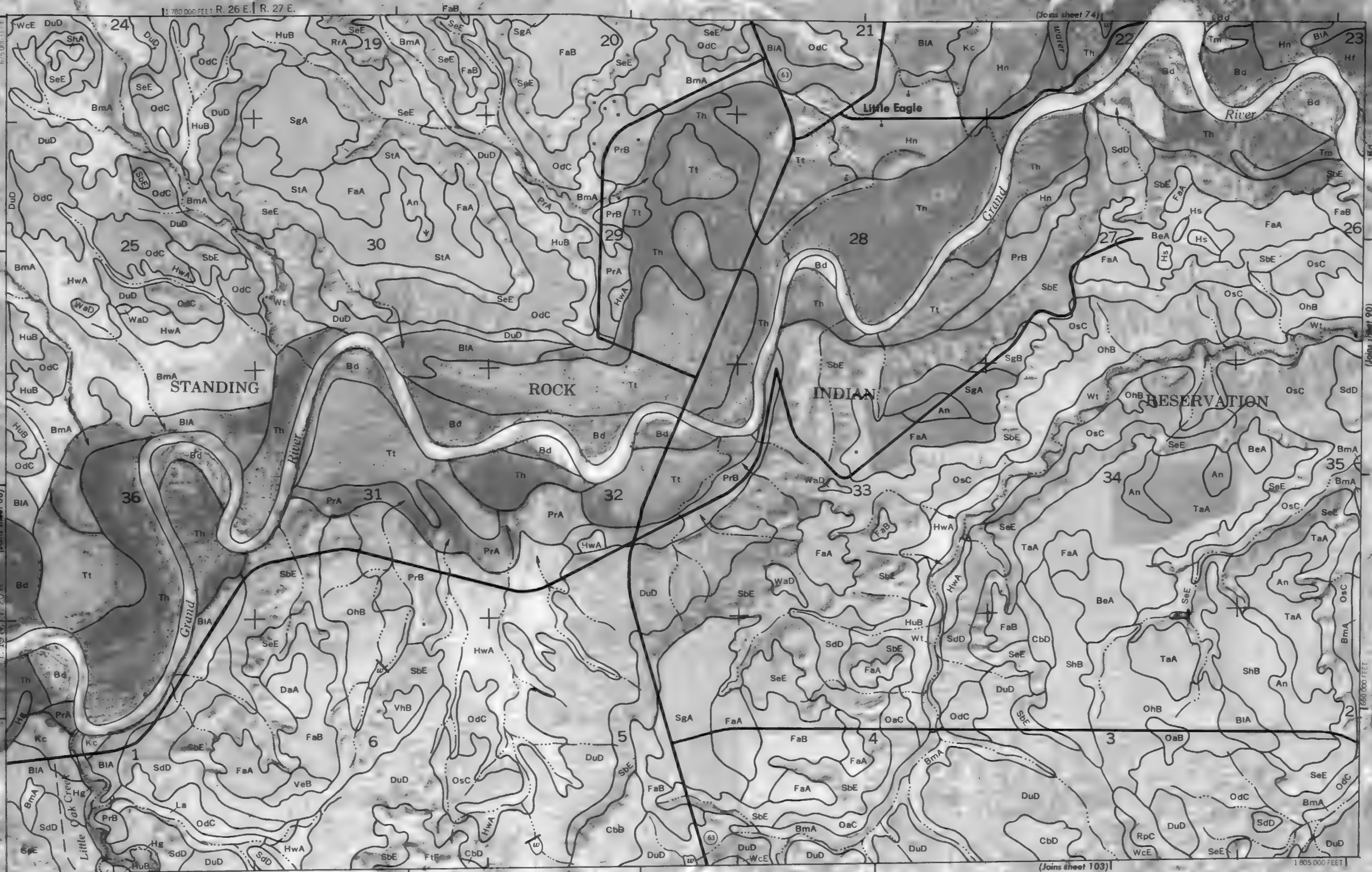
1600 000 FEET

1805 000 FEET

(Joins sheet 74)

(Joins sheet 90)

(Joins sheet 103)



1780 000 FEET R. 26 E. R. 27 E.

(Joins sheet 88)

T. 19 N. T. 20 N.

CORSON COUNTY, SOUTH DAKOTA NO. 89

This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

90

N

2 MILES

KILOMETERS

Scale 1:24,000

0

1/4

1/2

3/4

1

(Joins sheet 75)

R. 27 E. | R. 28 E.

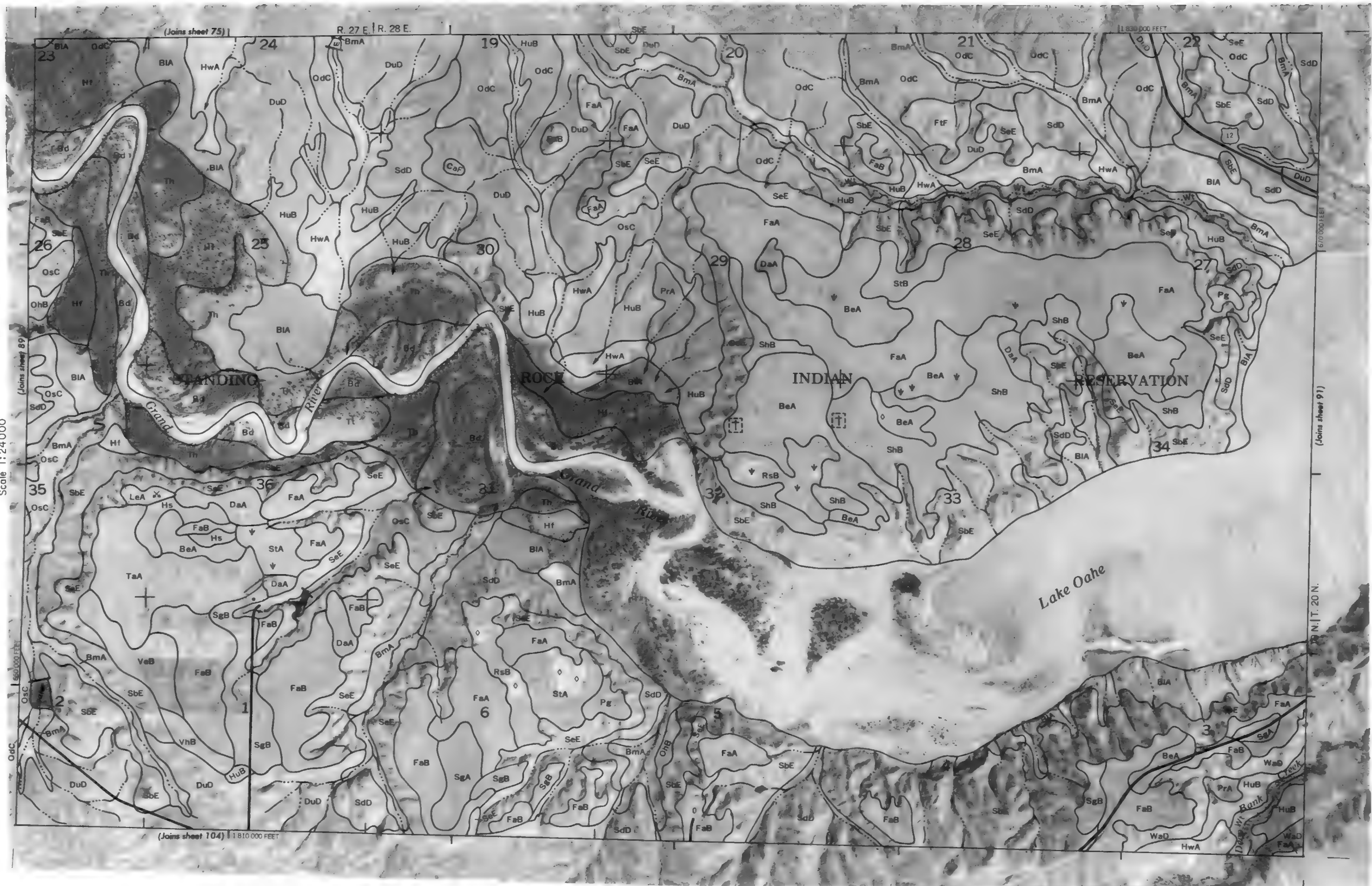
1:830,000 FEET

(Joins sheet 91)

1:830,000 FEET

(Joins sheet 104)

1:810,000 FEET





(Joins sheet 77) R. 29 E. R. 30 E. 1:60,000 FEET 1:24,000 (Joins sheet 91) 1:60,000 FEET 1:24,000 (Joins sheet 106) T. 19 N. T. 20 N. (Joins map, sheet 51)



2 MILES

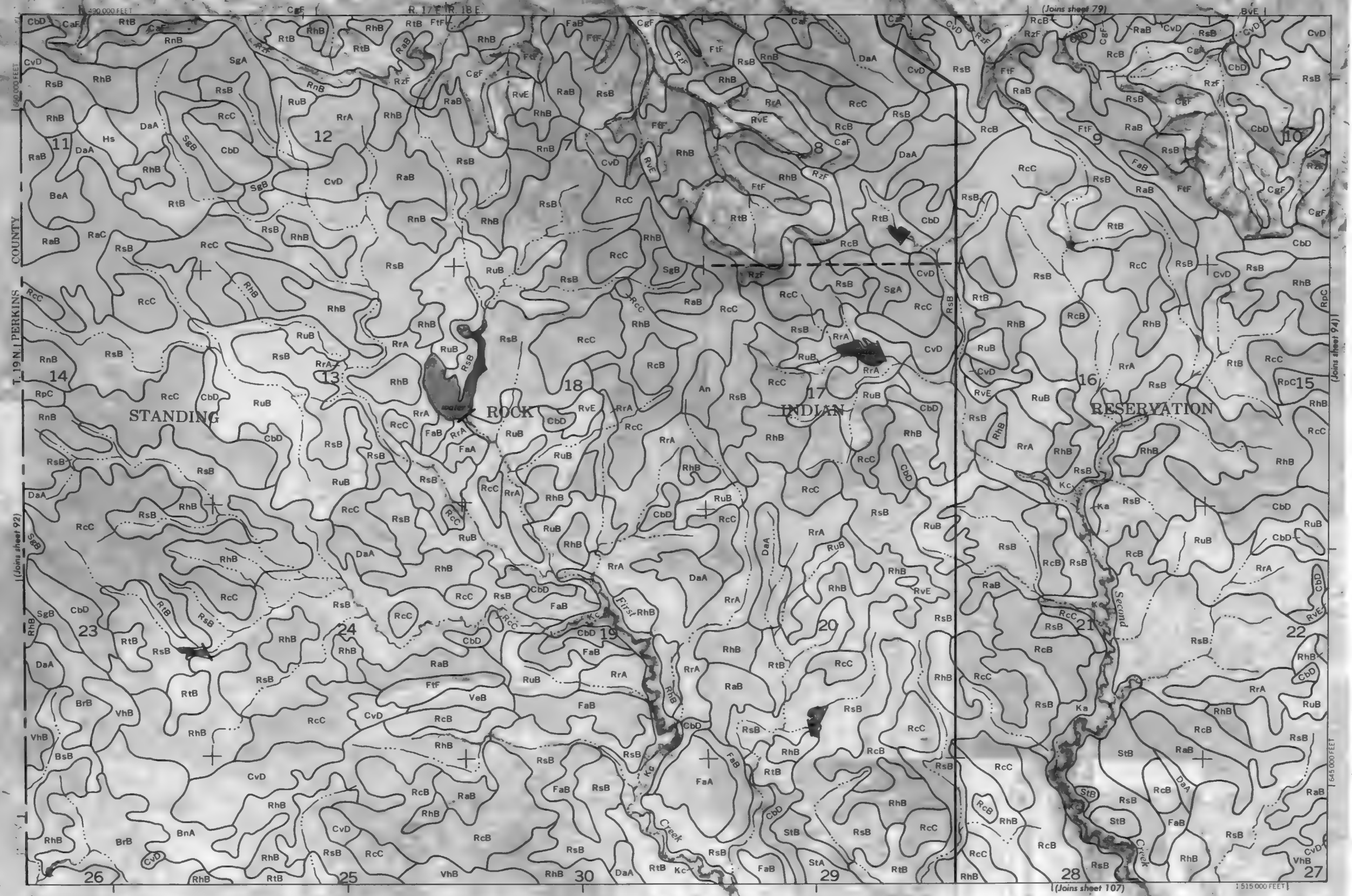
2 KILOMETERS

Scale 1:24,000

0 1/4 1/2 3/4 0.5

645,000 FEET

1515,000 FEET





	3/4	1/2	1/4	0
1				





2 MILES

2 KILOMETERS

Scale 1:24,000

645,000 FEET

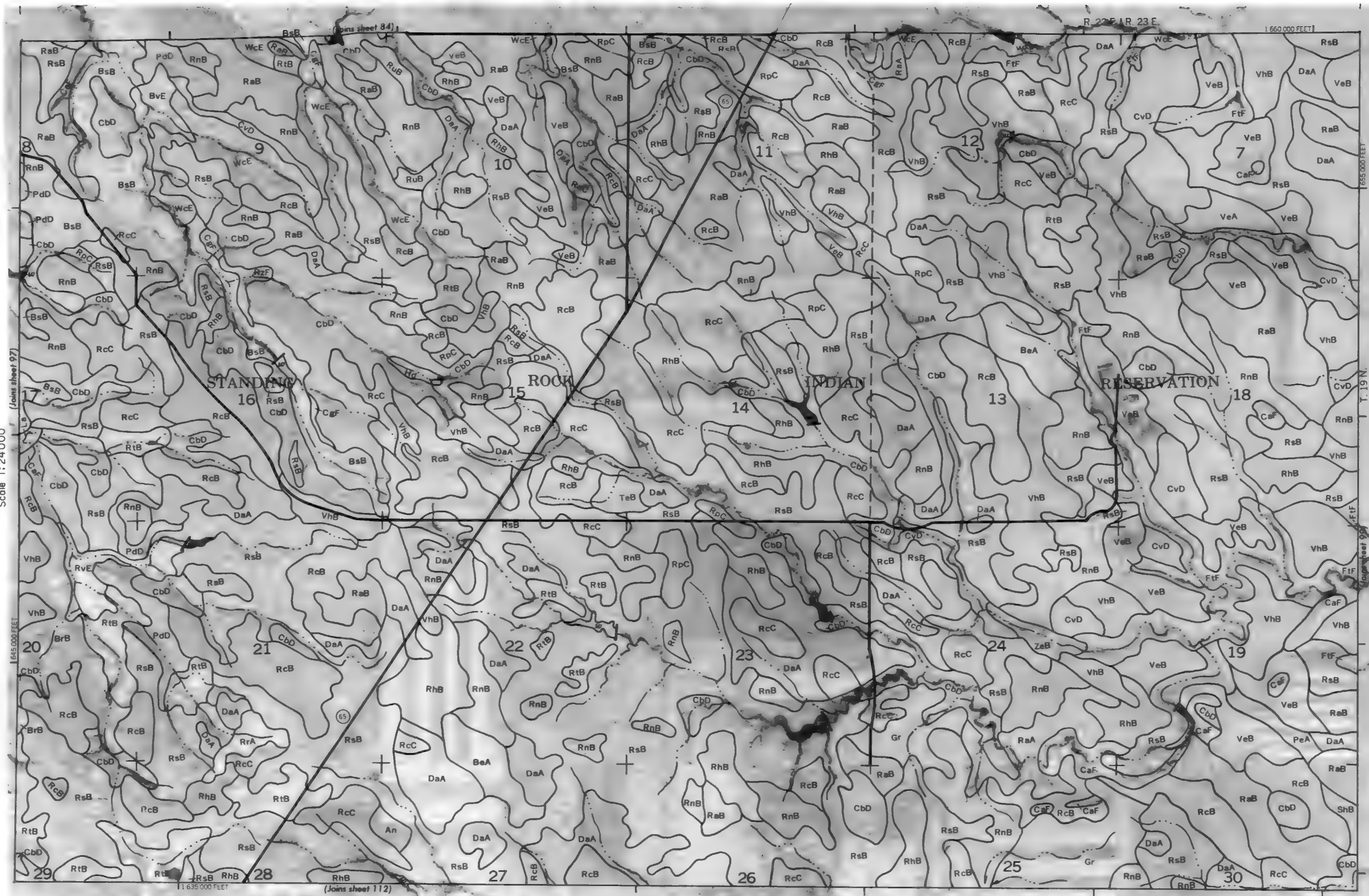
0 1/4 1/2 3/4

0 0.5

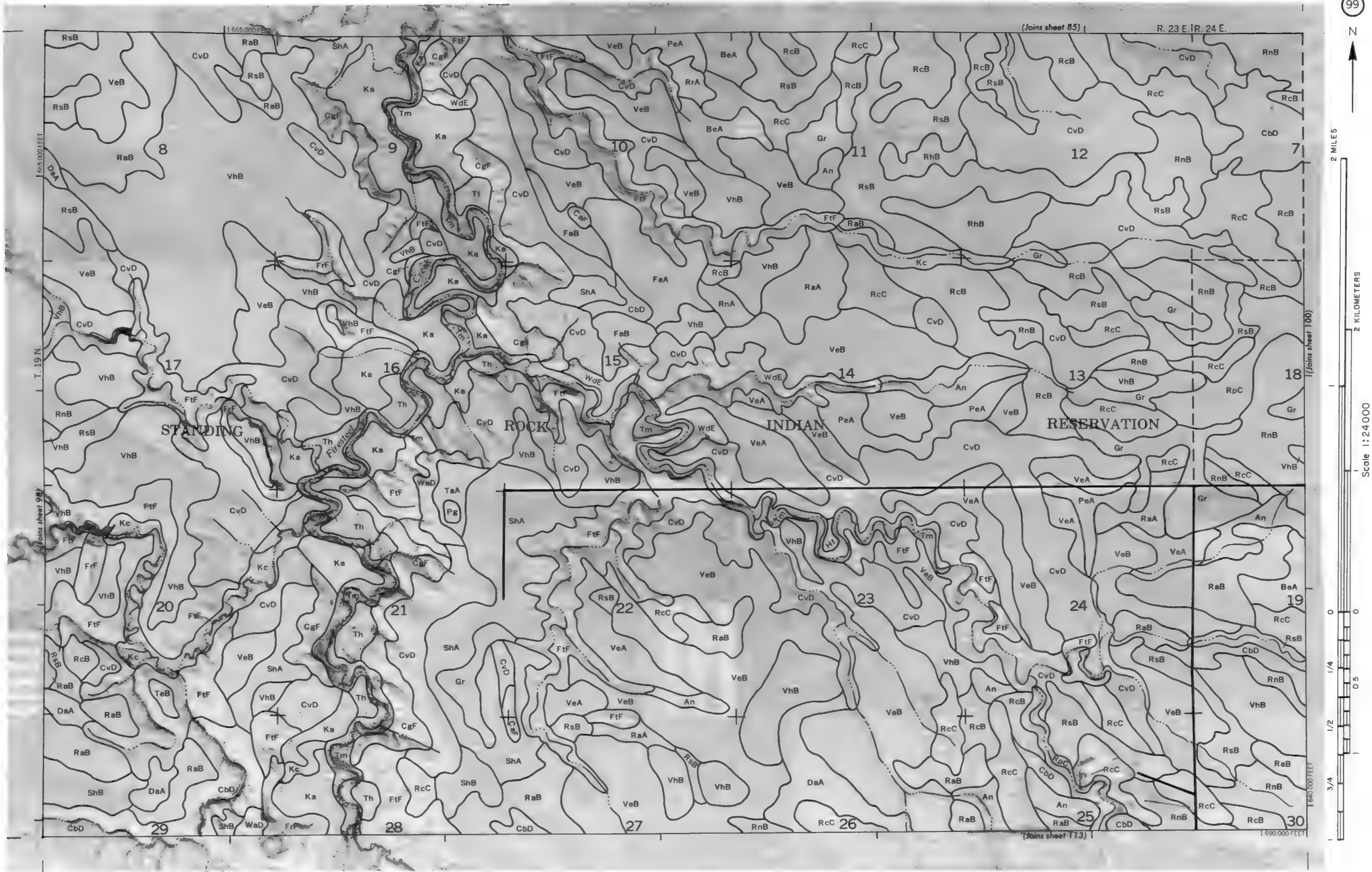
1

CORSON COUNTY, SOUTH DAKOTA NO. 97
This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture and is intended for general use. It does not show the location of individual farms, ranches, or other land ownership. It shows the general soil distribution and the location of major roads and water features.





CORSON COUNTY, SOUTH DAKOTA NO. 99
This soil map is a compilation of 1976 aerial photographs by the U.S. Department of Agriculture, Soil Conservation Service, and the South Dakota Department of Agriculture. It shows the approximate location of the Standing Rock Indian Reservation. The map is not to scale and is not intended for navigation.



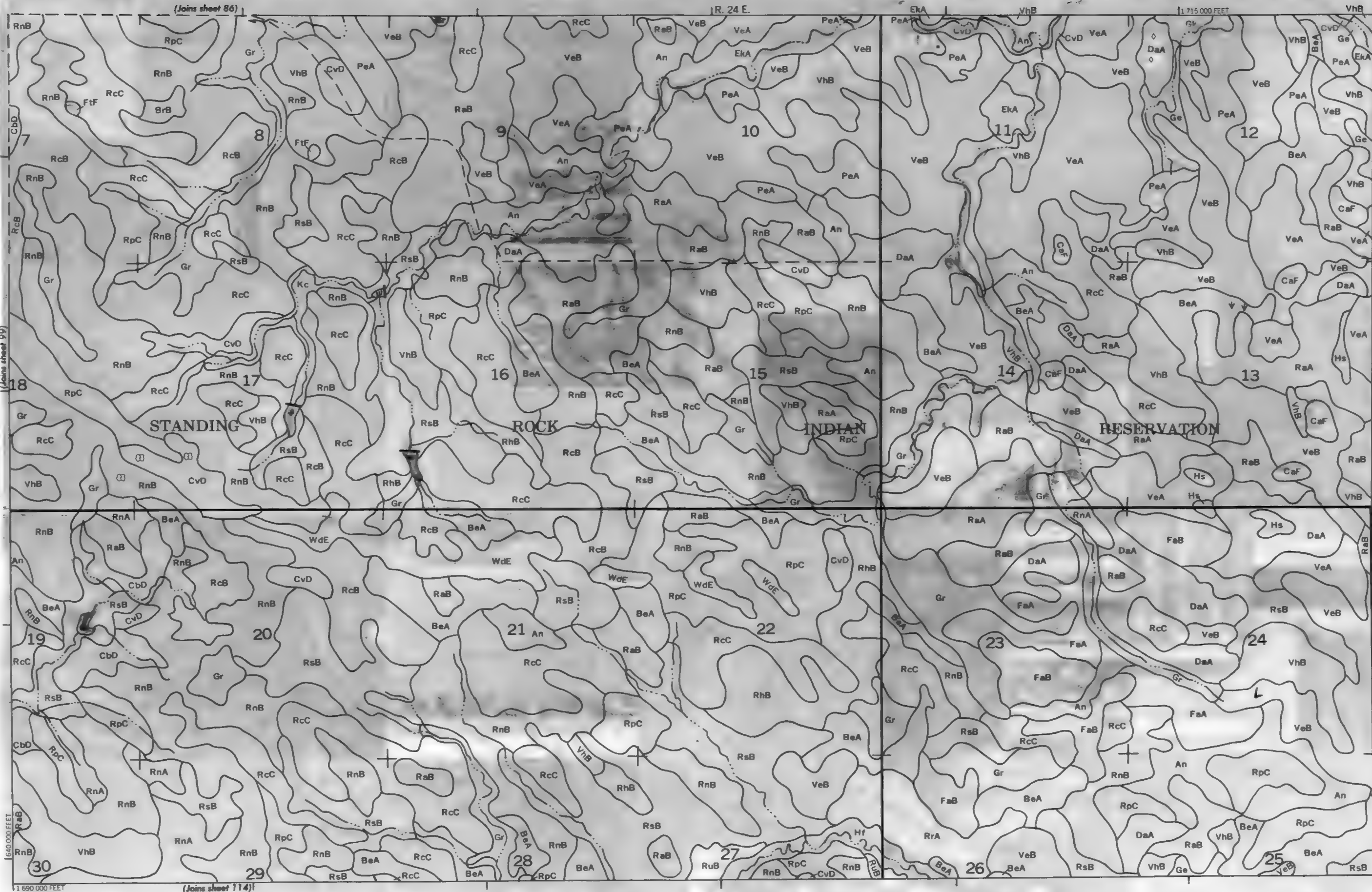
100



2 MILES

2 KILOMETERS

Scale 1:24,000

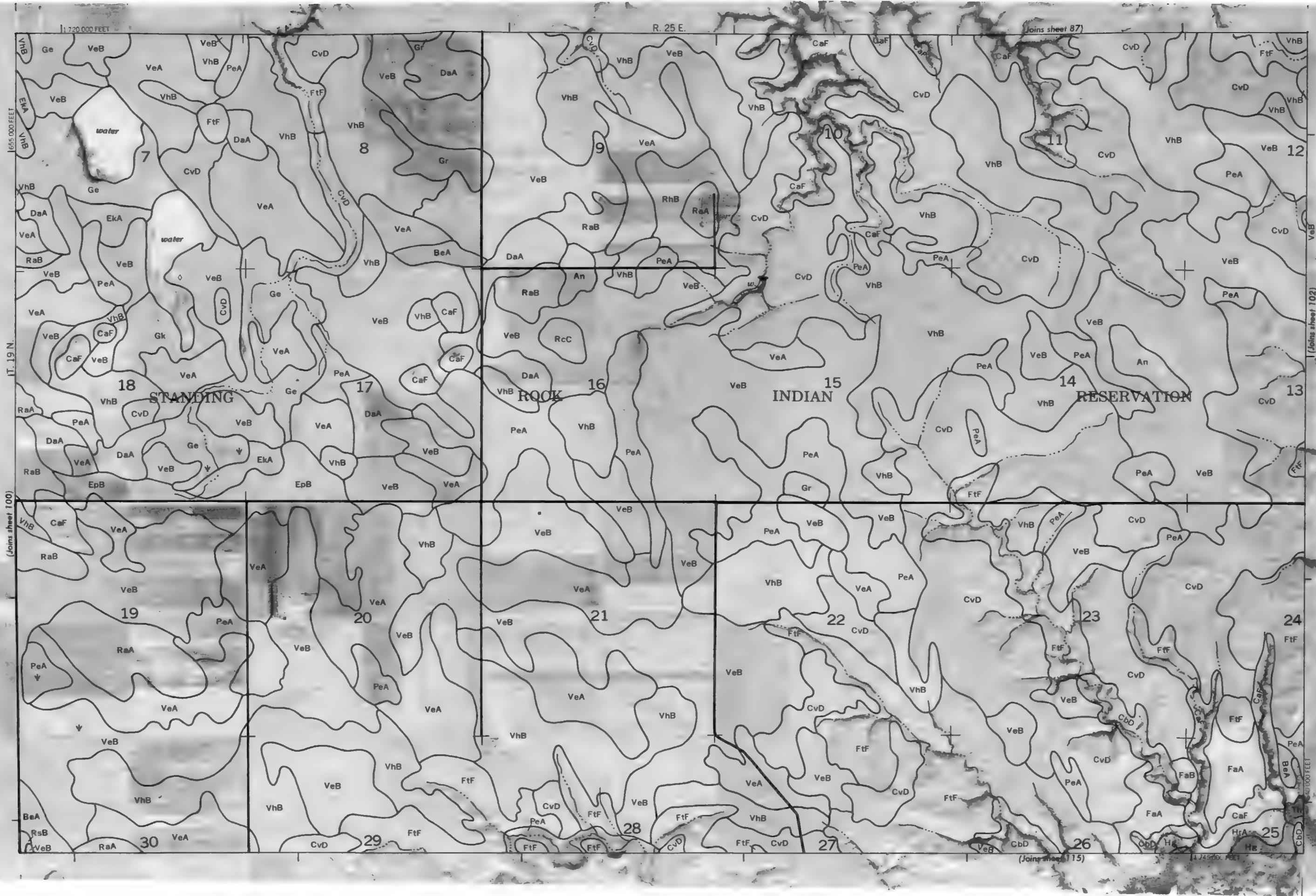


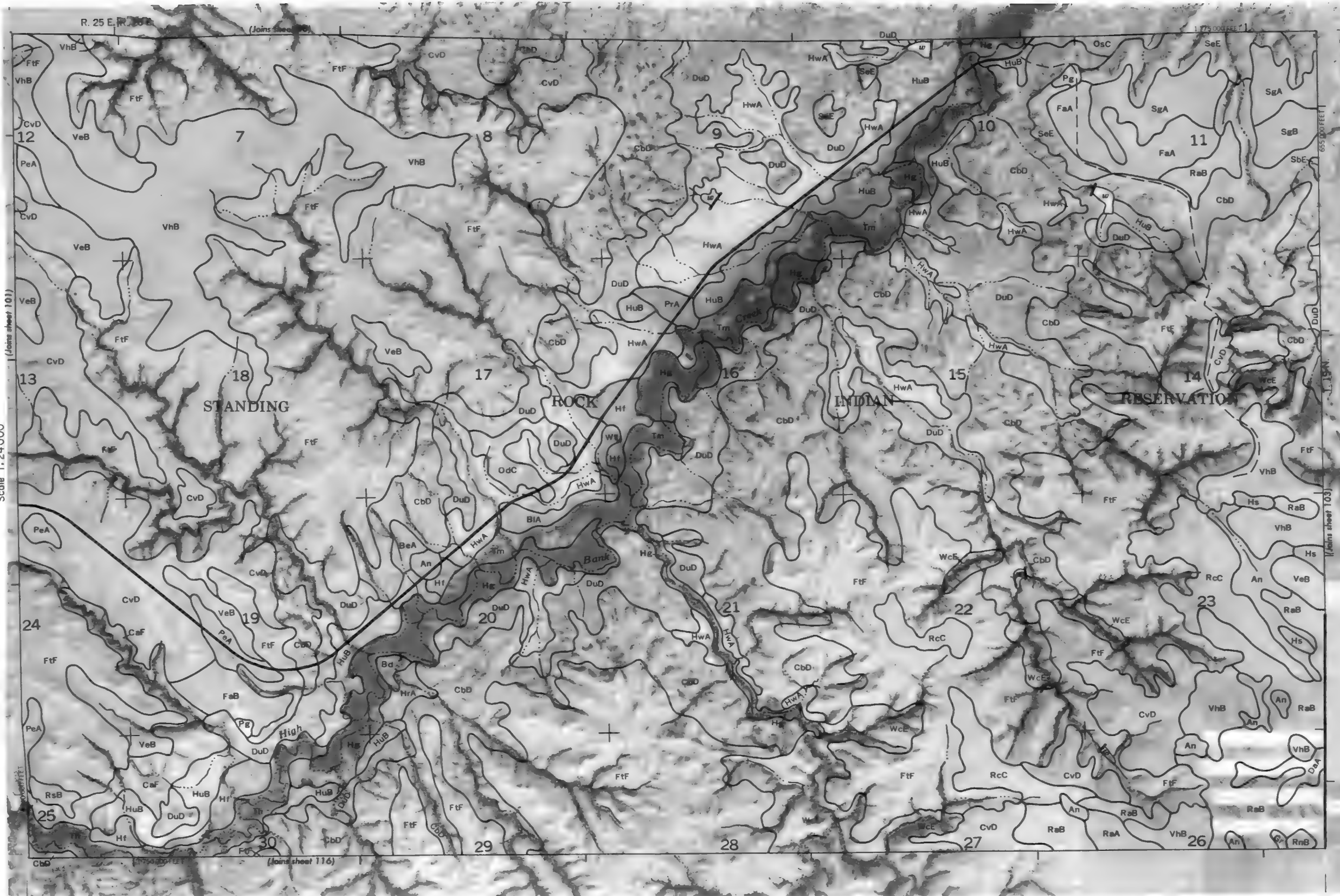


2 MILES

2 KILOMETERS

Scale 1:24000







This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximate only. **CORSON COUNTY, SOUTH DAKOTA NO. 104**



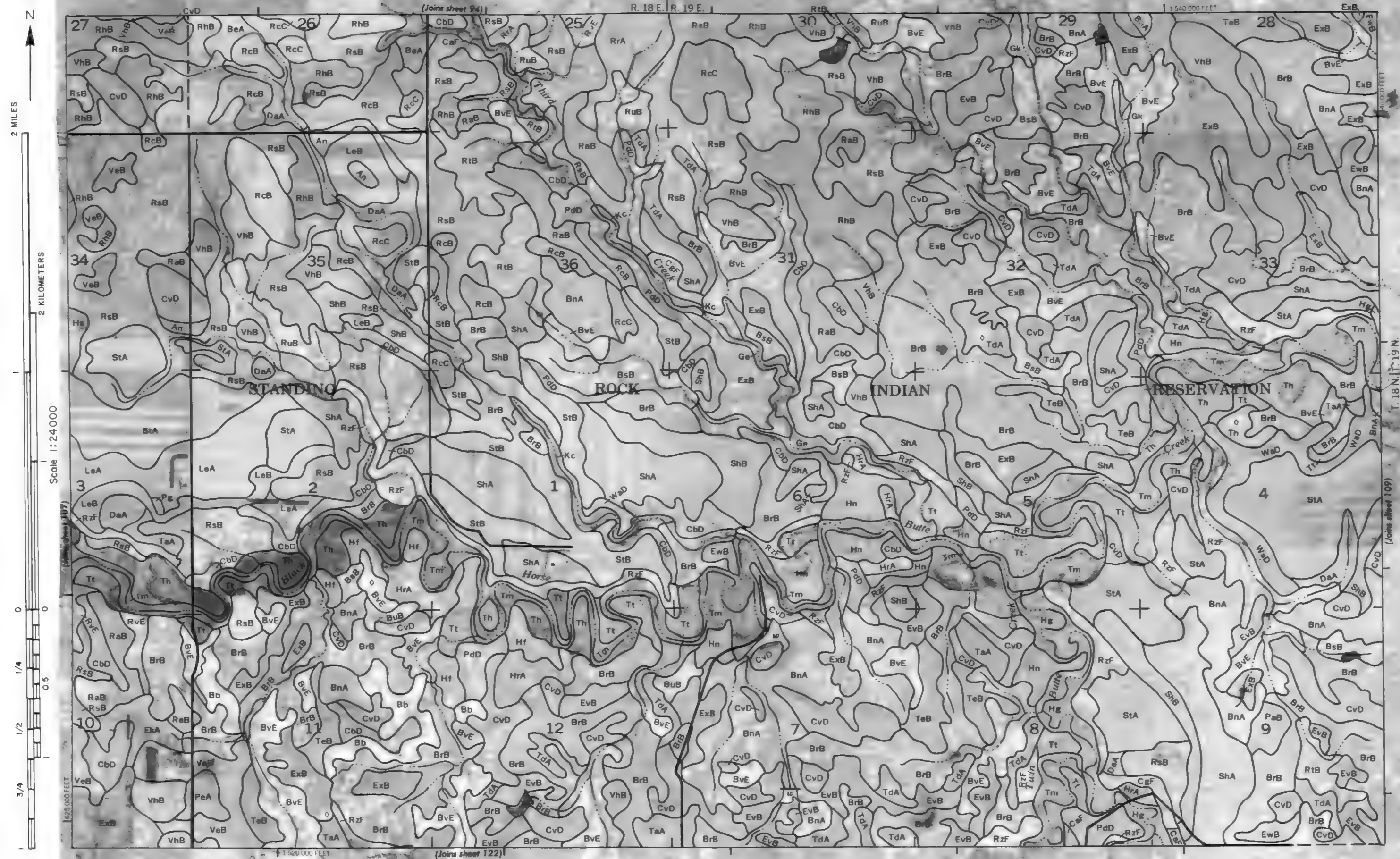


2 MILES
7

2 KILOMETERS

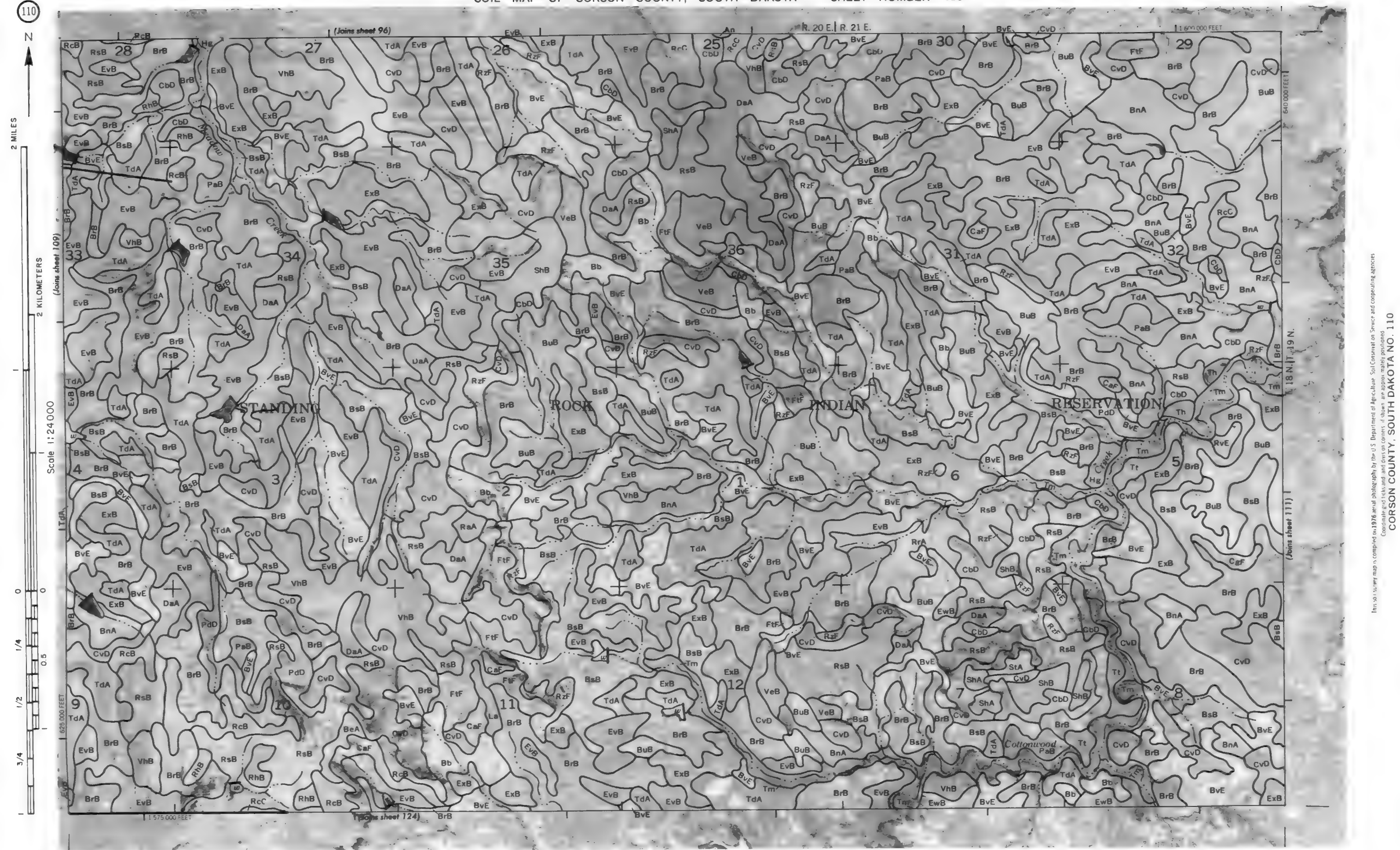
459





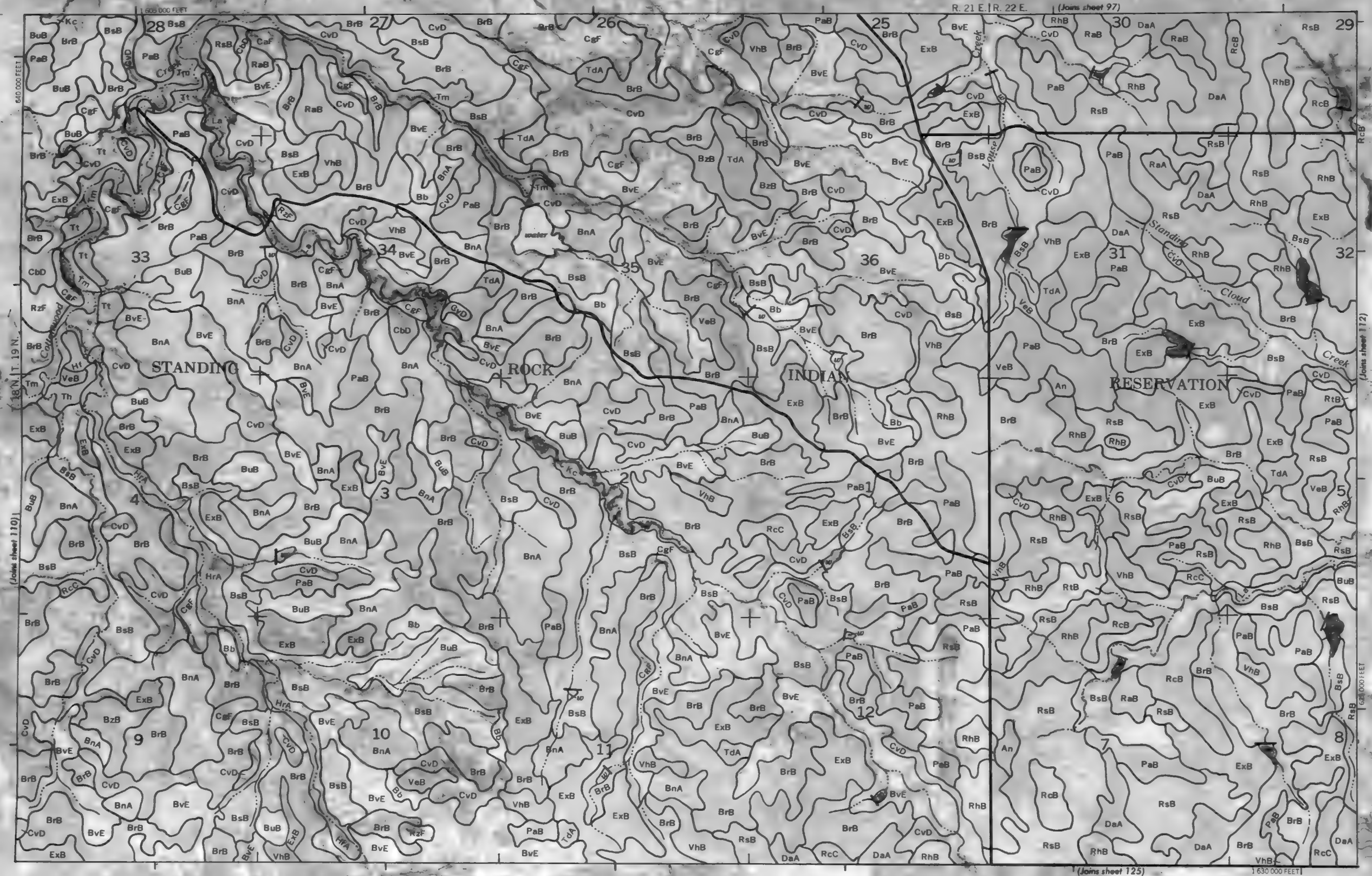


These data were analyzed by the Department of Agriculture and Forestry in 1976 and 1977 and are reported in Table 1. The data show that the majority of the land in the county is in the hands of a few large landowners. The majority of the land is in the hands of a few large landowners. The majority of the land is in the hands of a few large landowners.

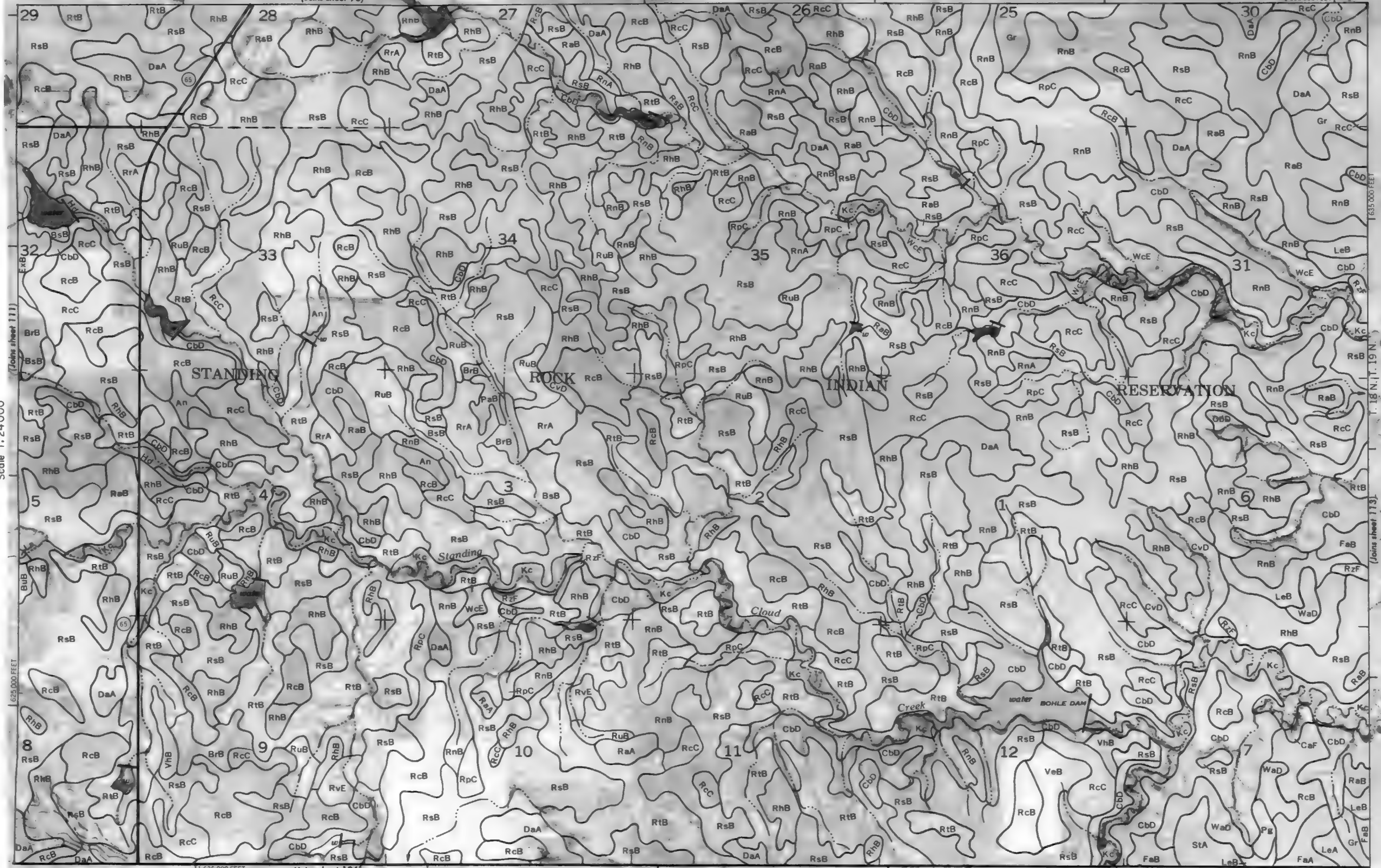


CORSON COUNTY, SOUTH DAKOTA NO. 111

This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



1 660 000 FEET



This soil survey map is compiled on 1976 aerial photography by the U. S. Department of Agriculture - Soil Conservation Service and cooperating agencies

Coordinate grid ticks and land division corners if shown are approximately positioned

CORSON COUNTY, SOUTH DAKOTA NO. 112



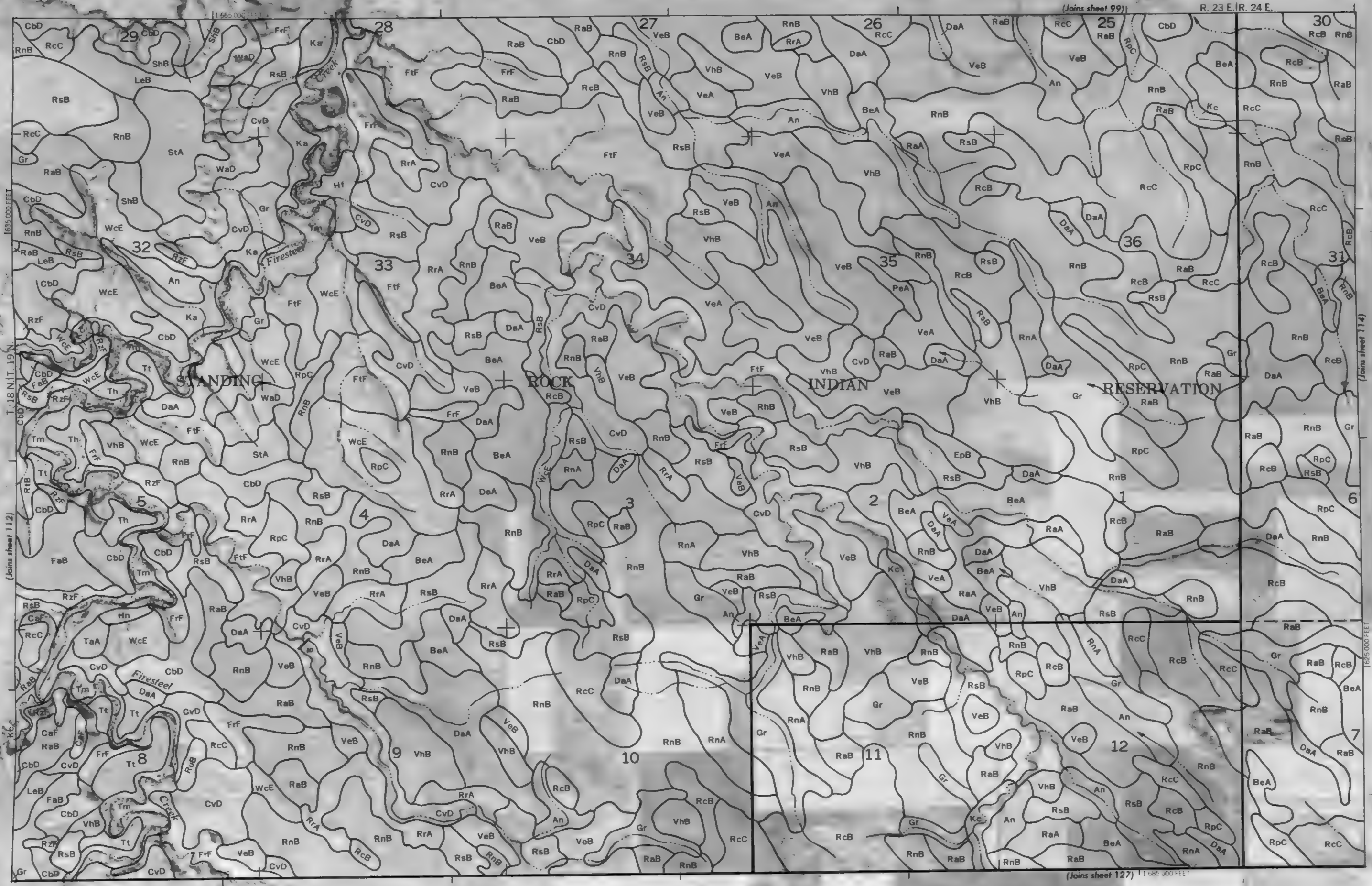
2 MILES

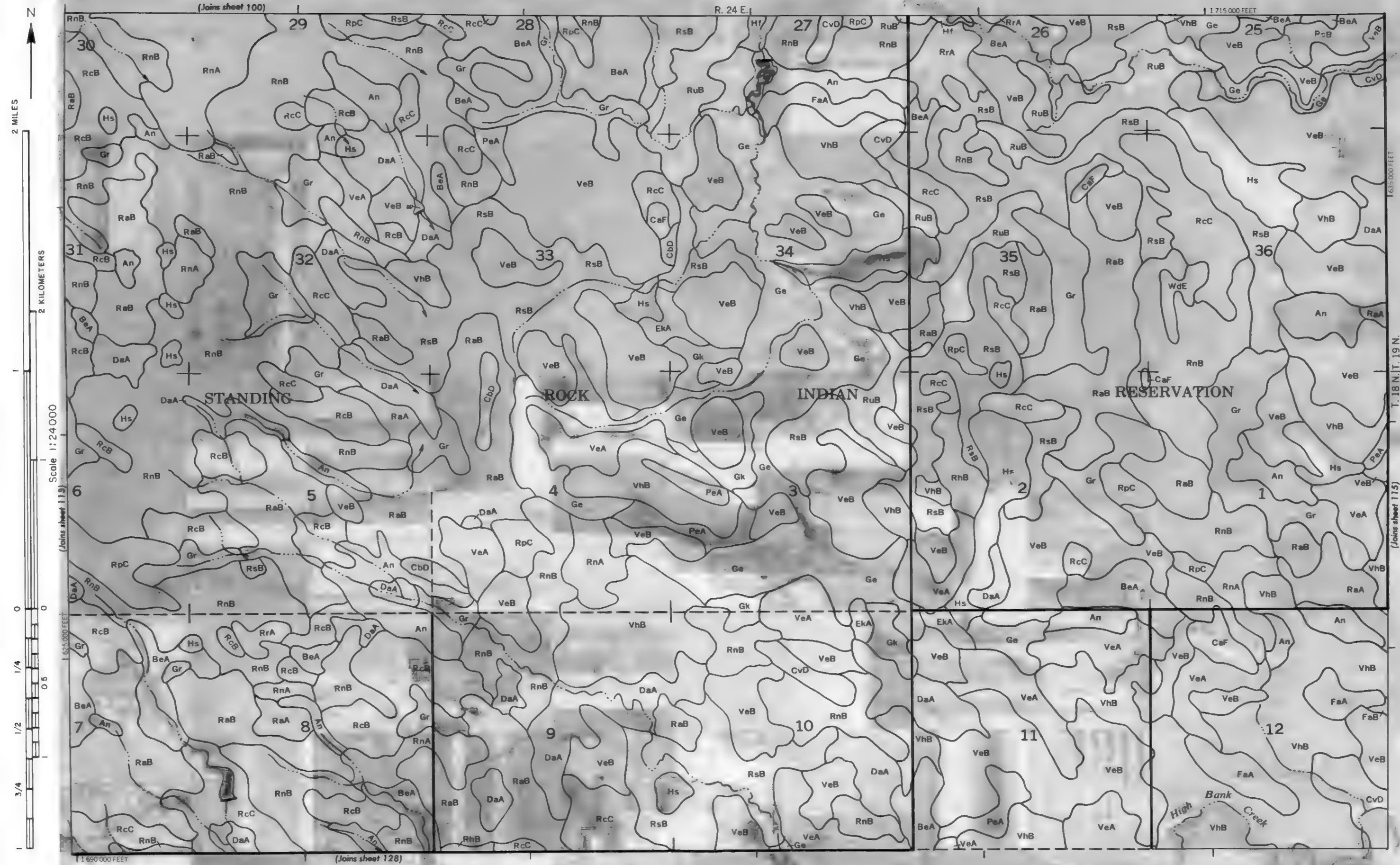
2 KILOMETERS

Scale 1:24000

CORSON COUNTY, SOUTH DAKOTA NO. 113

This soil map is compiled on 1976 soil survey data by the U.S. Department of Agriculture, Soil Conservation Service, and is subject to change. It should be used as a guide only and not as a basis for legal action.





This is a survey map compiled and published by the U.S. Department of Agriculture, Soil Conservation Service, in cooperation with the South Dakota State Department of Agriculture. The map is based on a survey of the Standing Rock Indian Reservation, South Dakota, made in 1916. The map is published by the U.S. Government Printing Office, Washington, D.C., 1916. The map is published by the U.S. Government Printing Office, Washington, D.C., 1916. The map is published by the U.S. Government Printing Office, Washington, D.C., 1916.



2 MILES

2 KILOMETERS

Scale 1:24,000

625,000 FEET

1/4

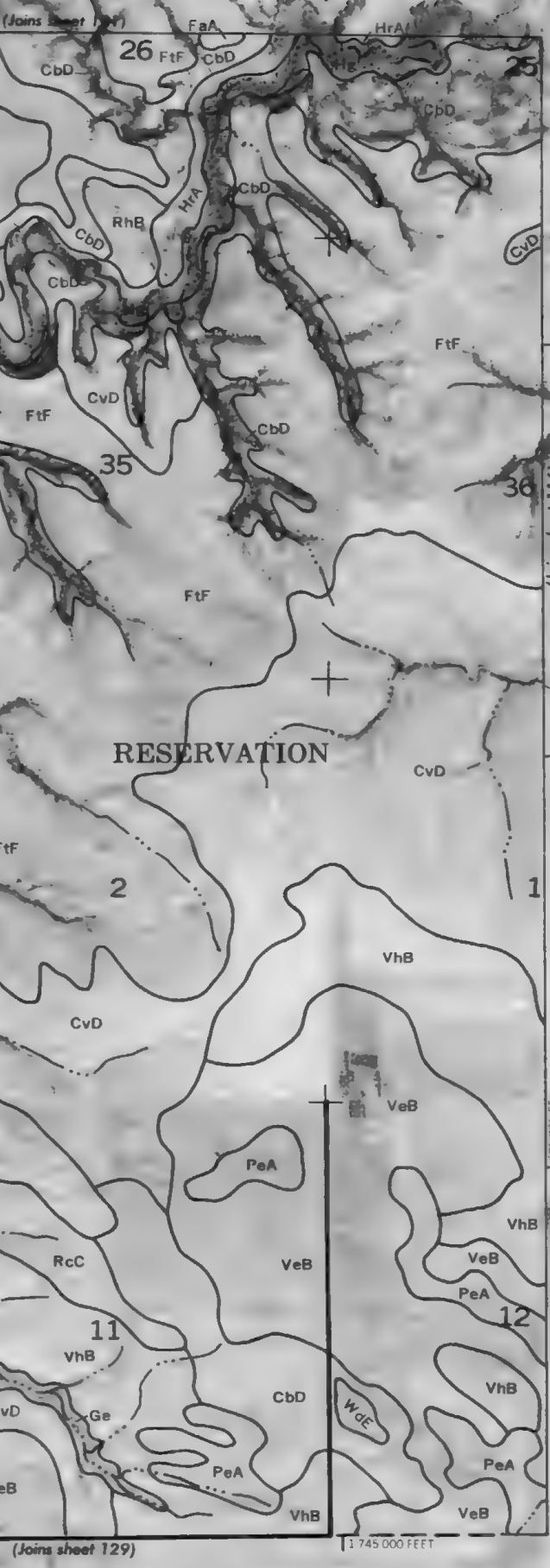
0.5

1/2

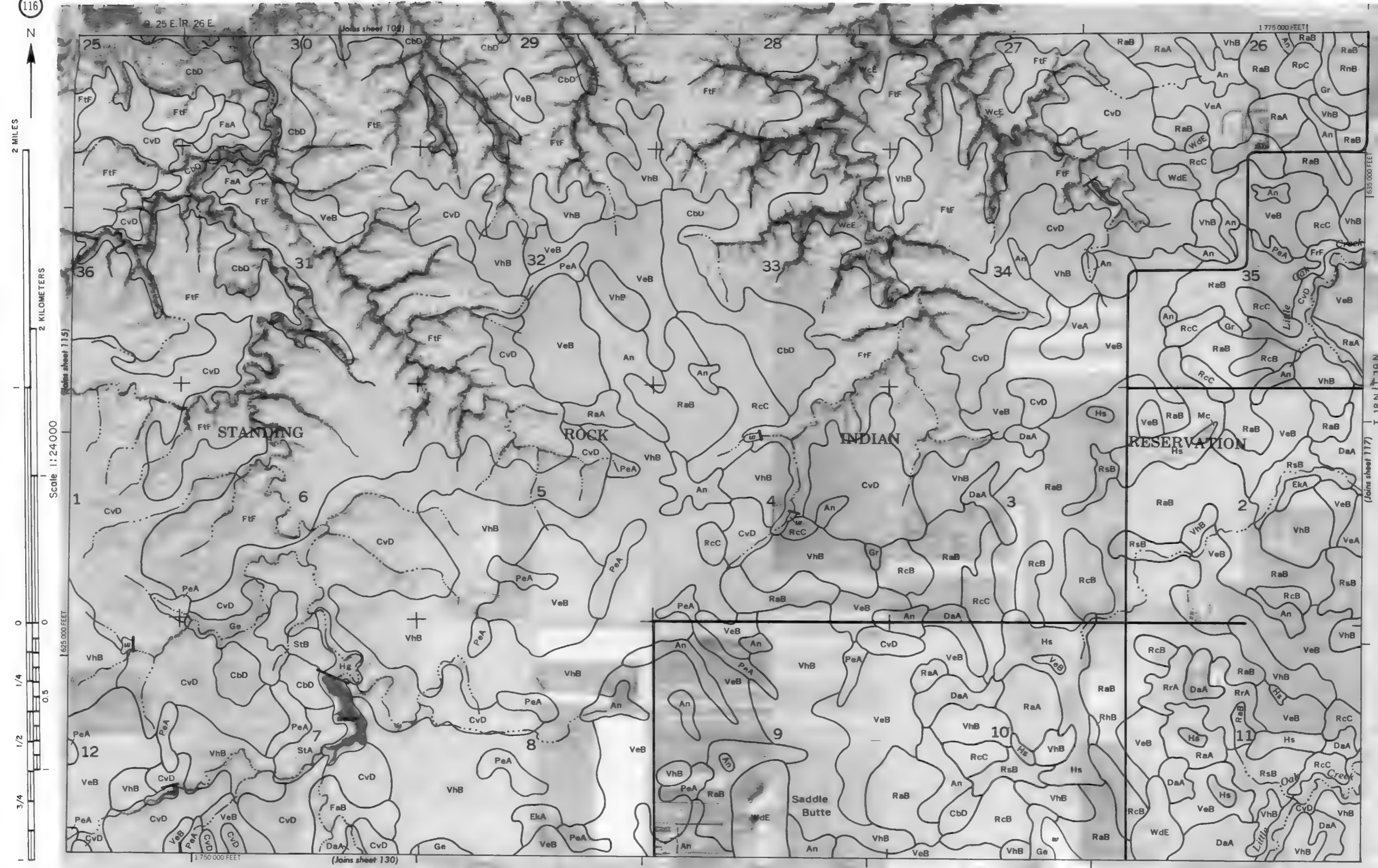
3/4

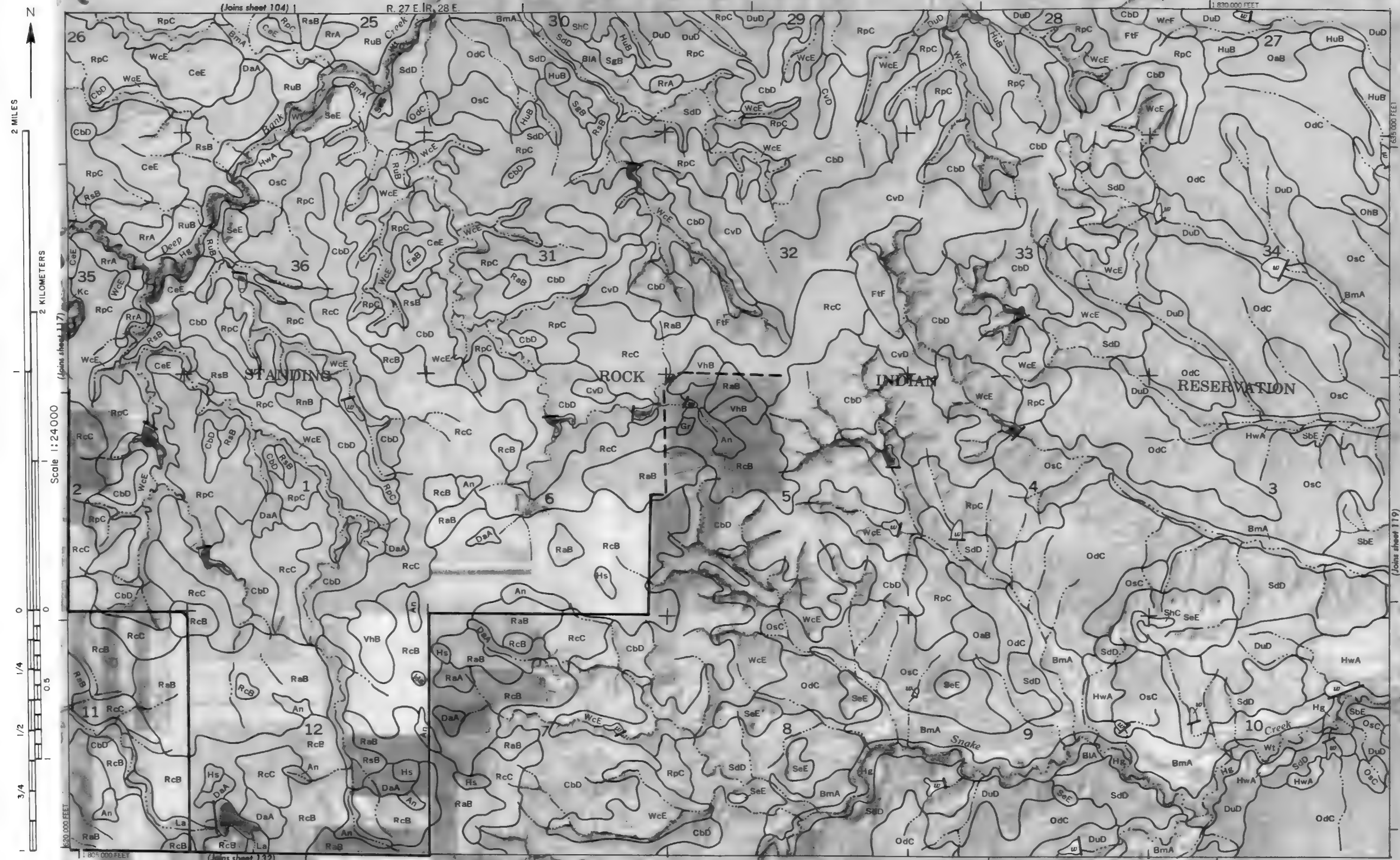
1

1 745,000 FEET



CORSON COUNTY, SOUTH DAKOTA NO. 115
This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.





This soil map was made in 1976 as a part of the Soil Conservation Service's Agricultural Land Use Survey. It is based on aerial photographs and field observations. The map is a generalization of the soil data and should not be used for detailed soil analysis. The map is a part of the Soil Conservation Service's Agricultural Land Use Survey. The map is a part of the Soil Conservation Service's Agricultural Land Use Survey.

R. 28 E. | R. 29 E.

1:835 000 FEET

(Joins sheet 105)



2 MILES

2 KILOMETERS

Scale 1:24 000



1:860 000 FEET

(Joins sheet 133)

T. 18 N. | T. 19 N.

(Joins sheet 118)

(Joins sheet 120)

CORSON COUNTY, SOUTH DAKOTA NO. 119

This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture. Soil Conservation Service and cooperating agencies.

Coordinate grid ticks and land division corners if shown are approximately positioned.

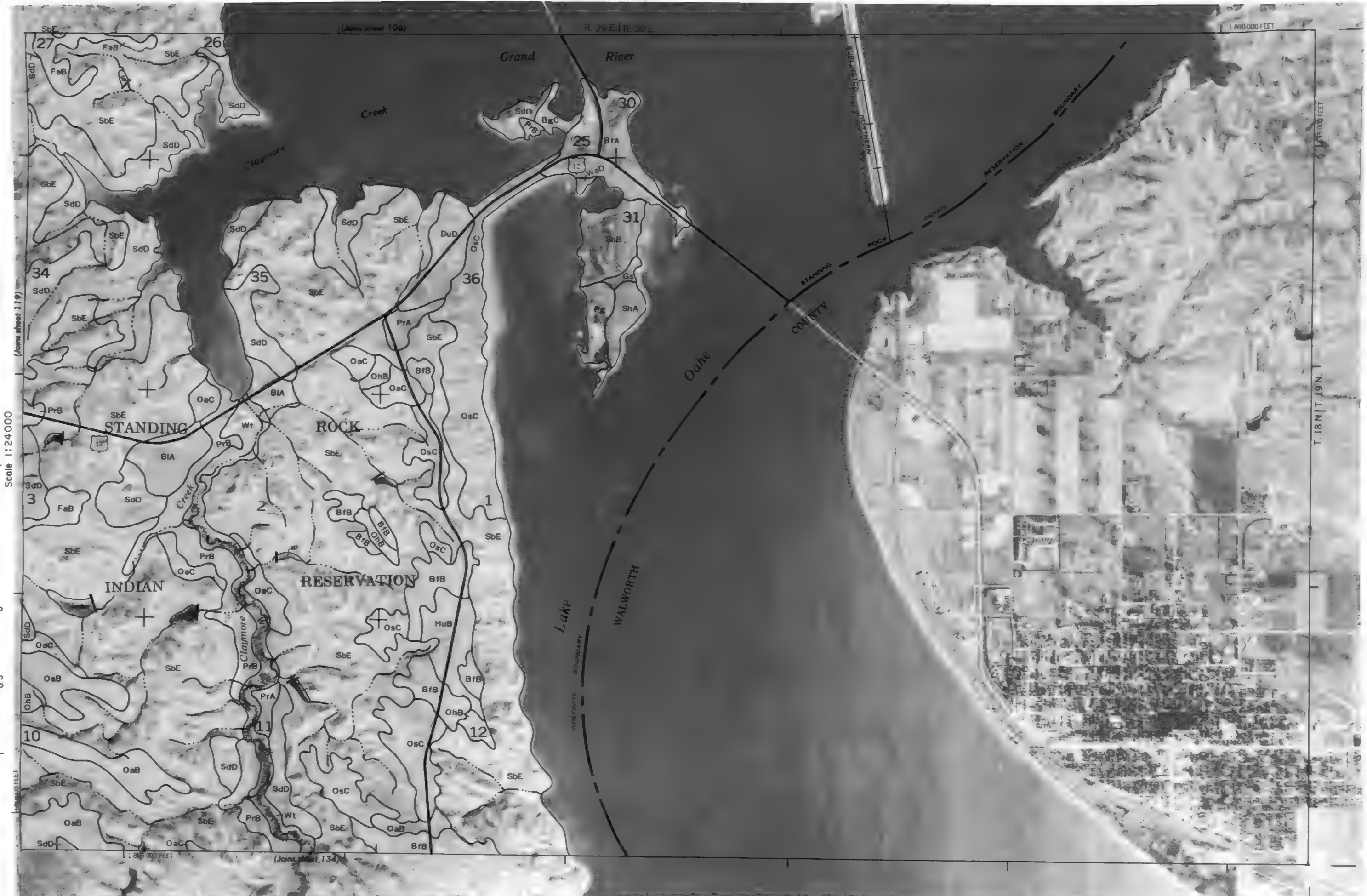




2 MILES

2 KILOMETERS

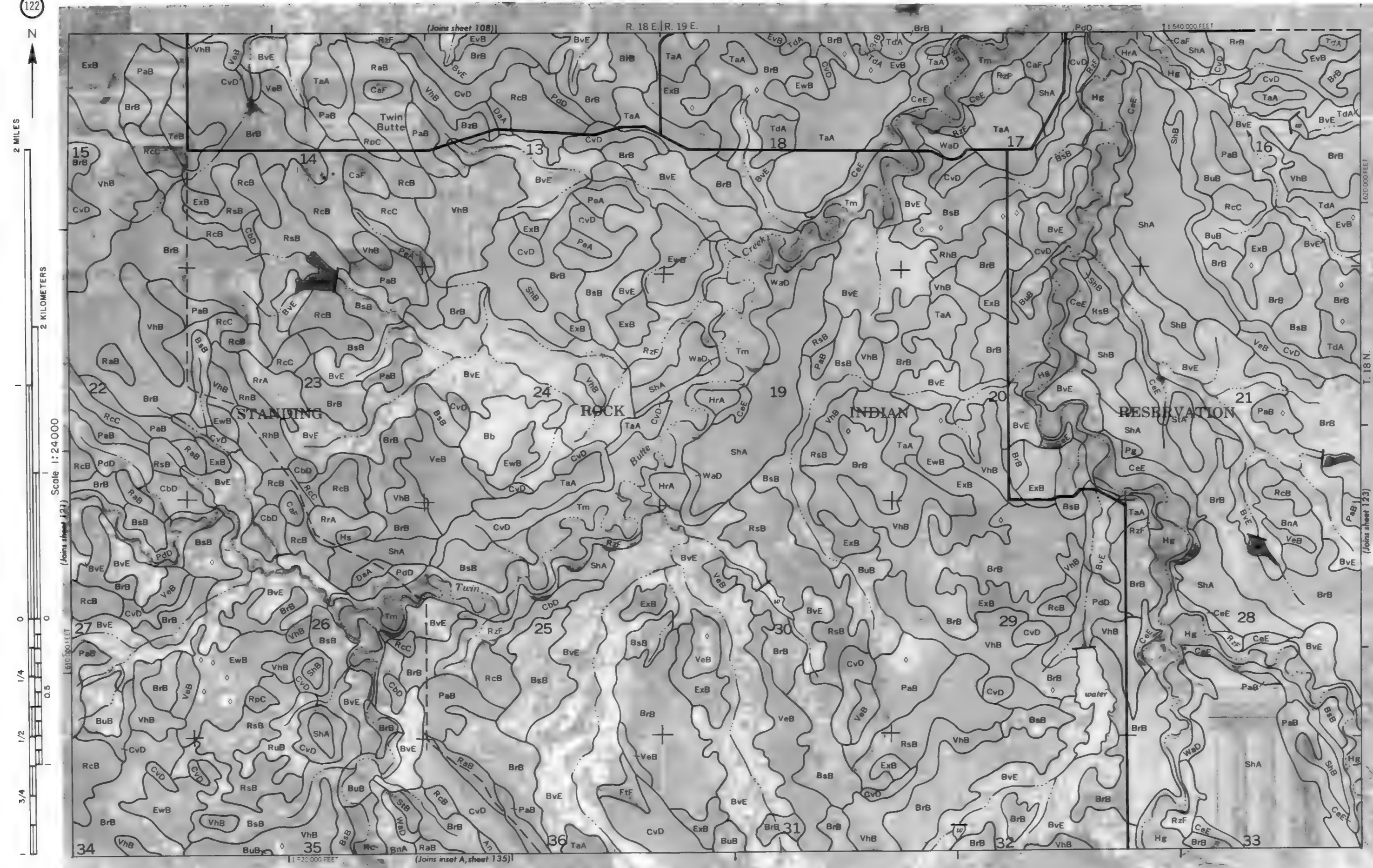
Scale 1:24000



This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

Joins sheet 122)





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CORSON COUNTY, SOUTH DAKOTA NO. 122

(Joins sheet 109)

1

2 KILOMETERS

Scale 1:24000

114

11

11

111

111

111

11

11

111

11

11

11

111

11

10

CORSON COUNTY, SOUTH DAKOTA NO. 123

This soil survey map is compiled from 1976 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

Coordinate grid ticks and land division corners if shown are approximately positioned and on 1976 aerial photography by the U.S. Department of Agriculture. Soil Conservation Service and cooperating agencies

1 545 000 FEET

(Join sheet 122)

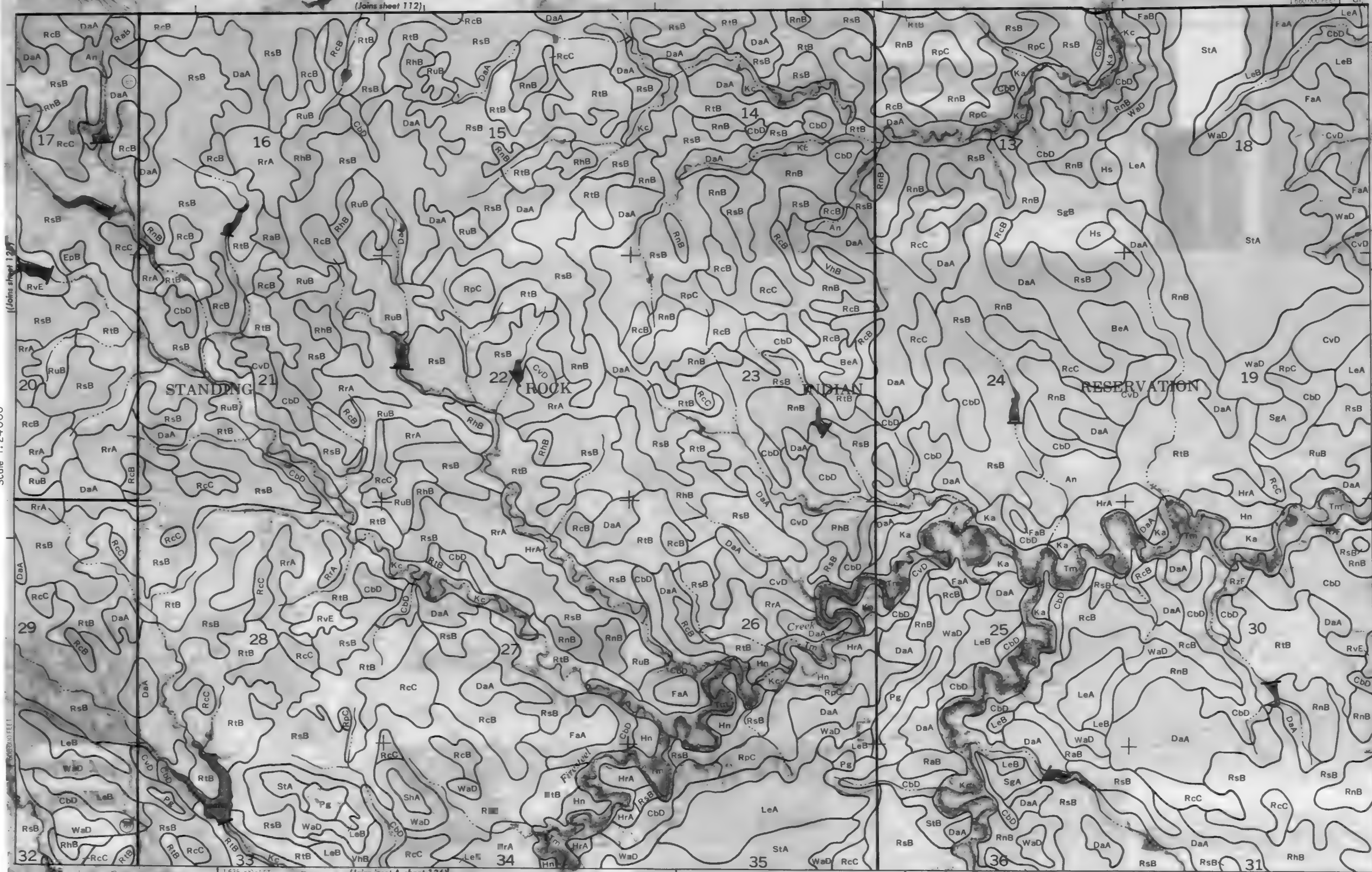
EWB (Joins inset B, sheet 135)

1570 000 FEE



This soil survey map is compiled on 1976 aerial photography by the U.S. Department of Agriculture. Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

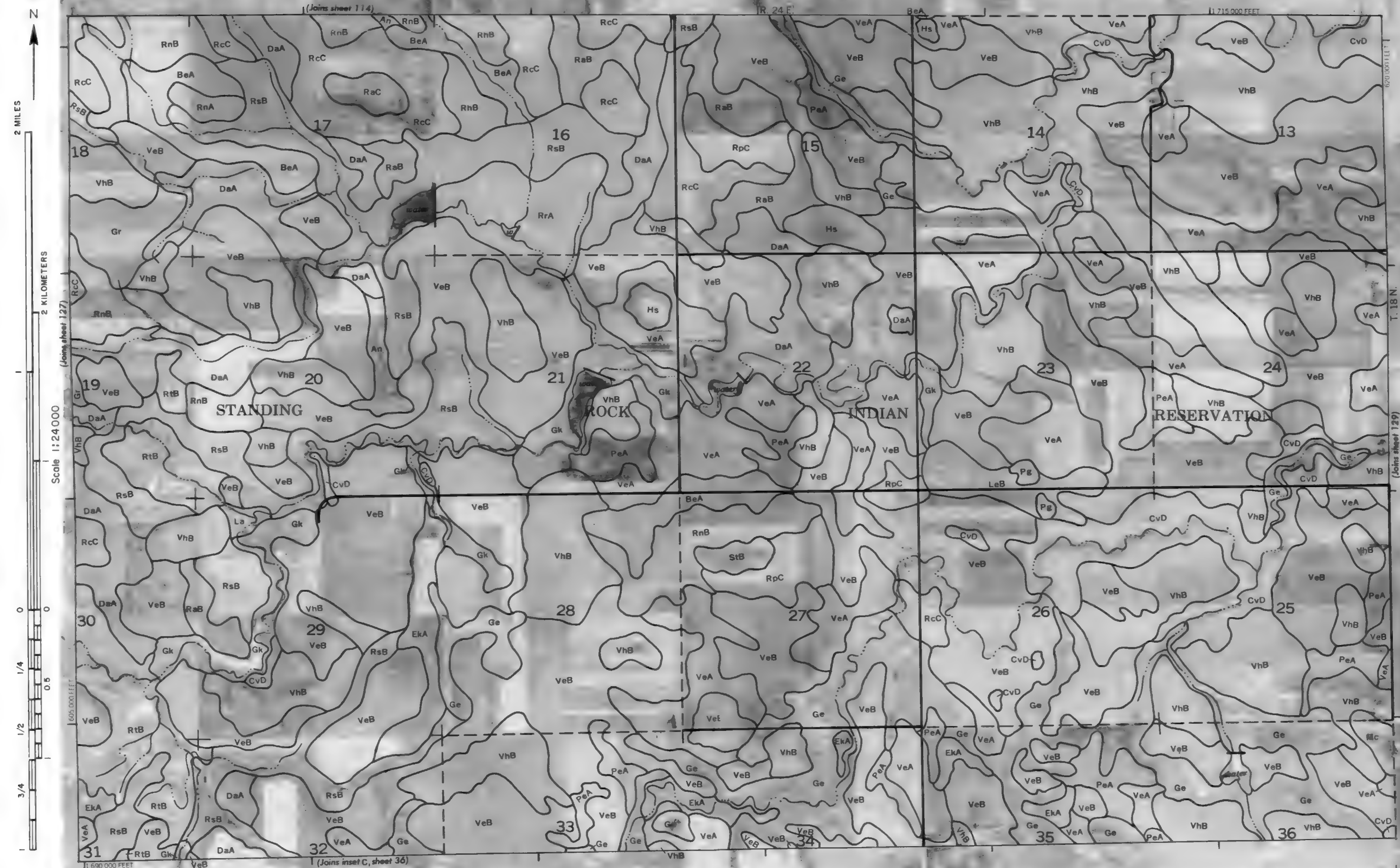




Coordinate grid ticks and land division corners, if shown, are approximately positioned



1
2 KILOMETERS
Scale 1:24000



□

2 KILOMETERS

1
Scale 1:24000





2 MILES

2 KILOMETERS

Scale 1:24 000

605 000 FEET

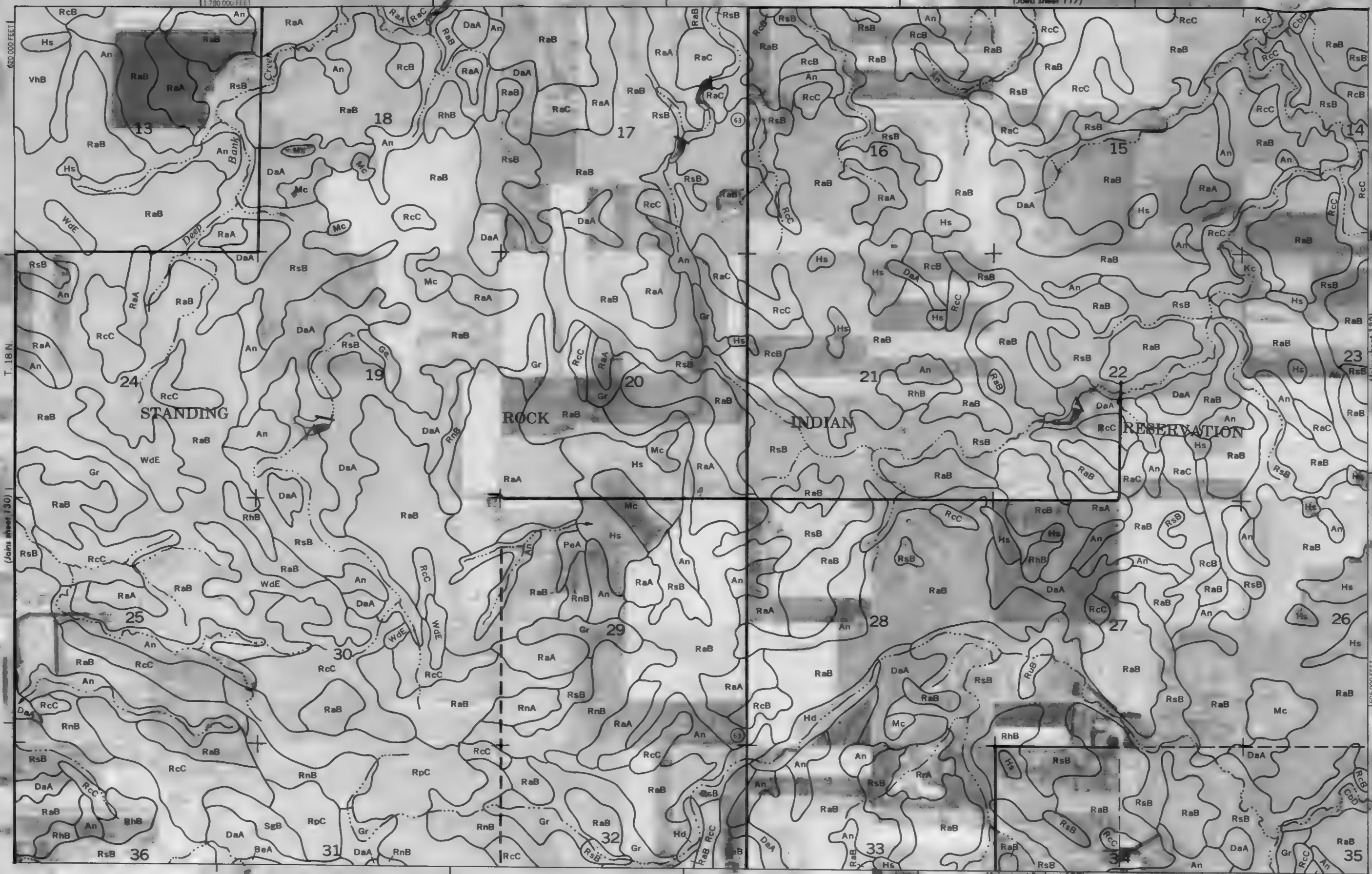
3/4 1/2 1/4 0

(Join sheet 117)

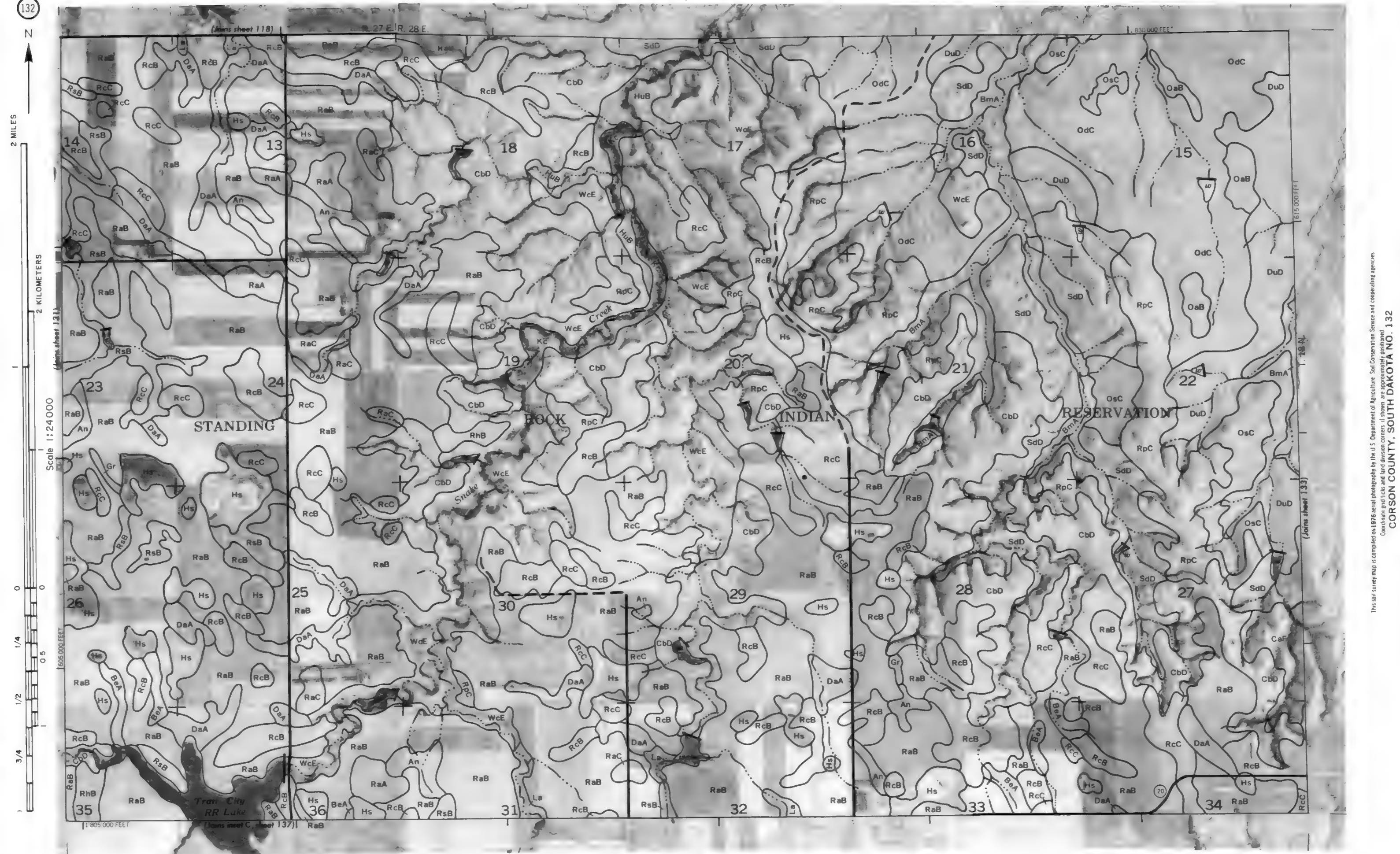
R. 26 E. R. 27 E.
11 790 000 FEET

(Join inset B, sheet 137)

11 800 000 FEET



CORSON COUNTY, SOUTH DAKOTA NO. 131
This soil survey map is compiled on 1976 aerial photographs by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinates and ticks and grid numbers are approximate values.



(Joins sheet 119)

11.835 000 FEET

N

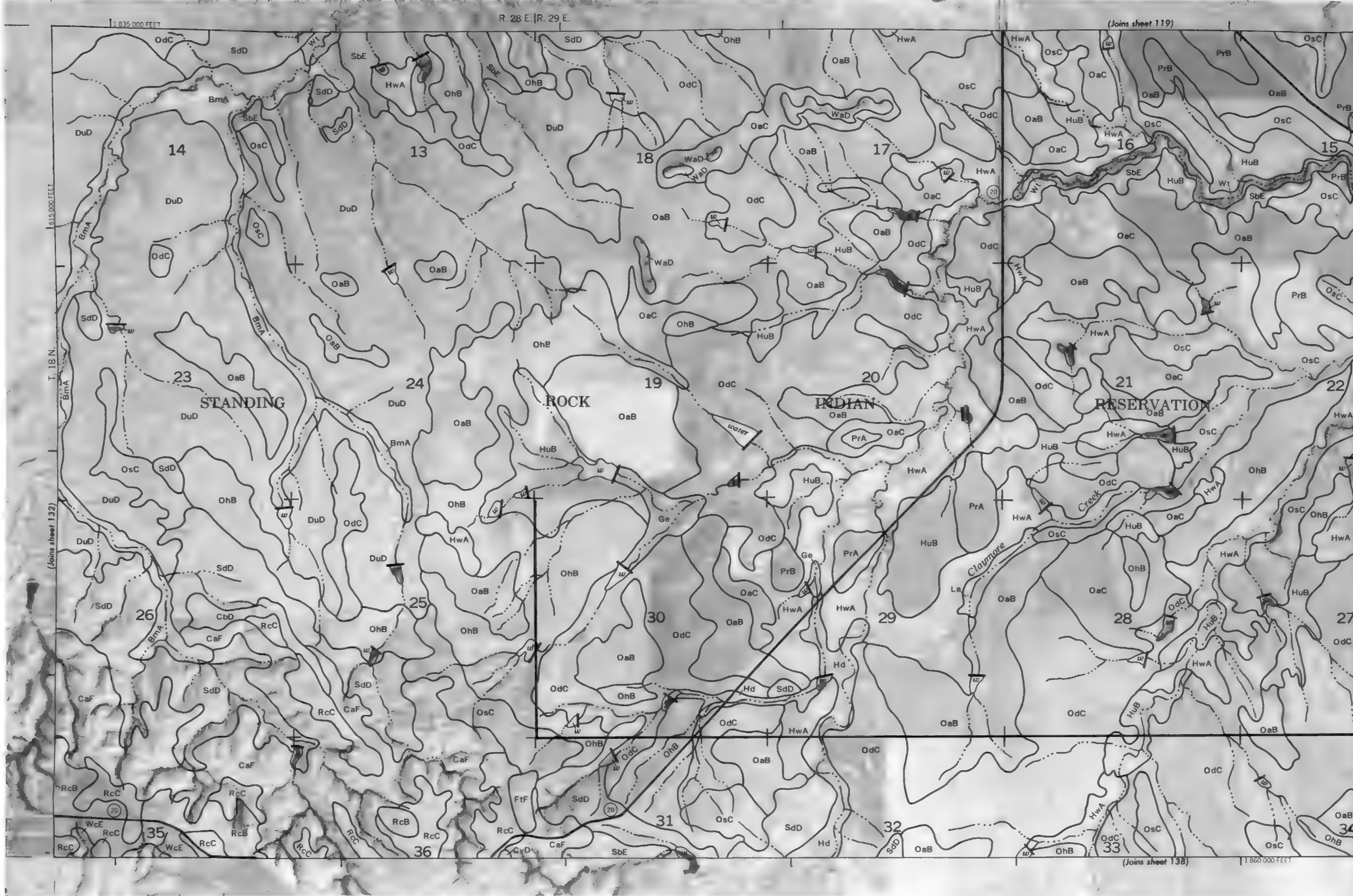
2 MILES

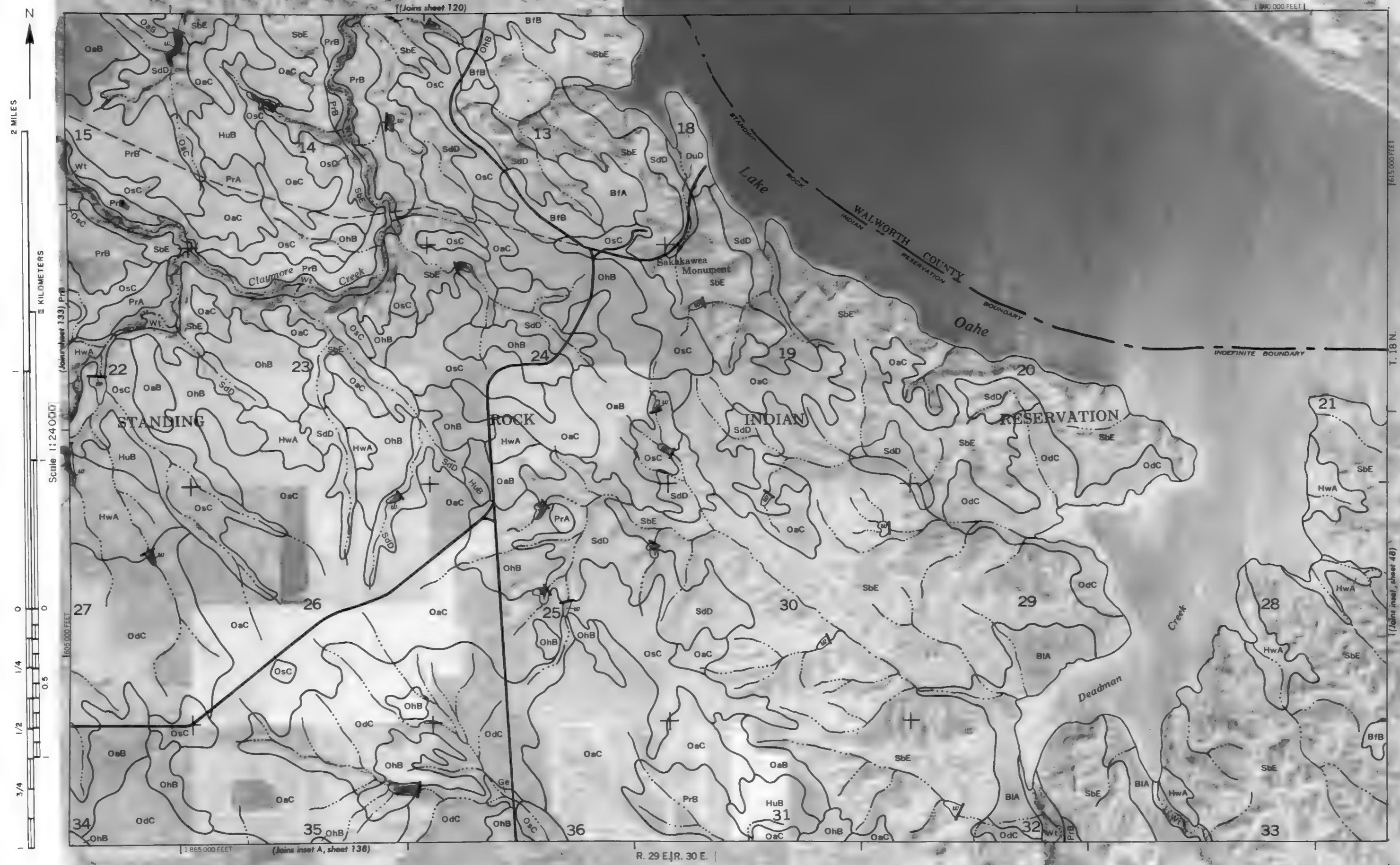
12 KILOMETERS

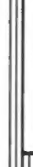
Scale 1:24000

	3/4	1/2	1/4	0
1	1	1	1	1
2	1	1	1	1
3	1	1	1	1
4	1	1	1	1
5	1	1	1	1
6	1	1	1	1
7	1	1	1	1
8	1	1	1	1
9	1	1	1	1
10	1	1	1	1
11	1	1	1	1
12	1	1	1	1
13	1	1	1	1
14	1	1	1	1
15	1	1	1	1
16	1	1	1	1
17	1	1	1	1
18	1	1	1	1
19	1	1	1	1
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22	1	1	1	1
23	1	1	1	1
24	1	1	1	1
25	1	1	1	1
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28	1	1	1	1
29	1	1	1	1
30	1	1	1	1
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89	1	1	1	1
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93	1	1	1	1
94	1	1	1	1

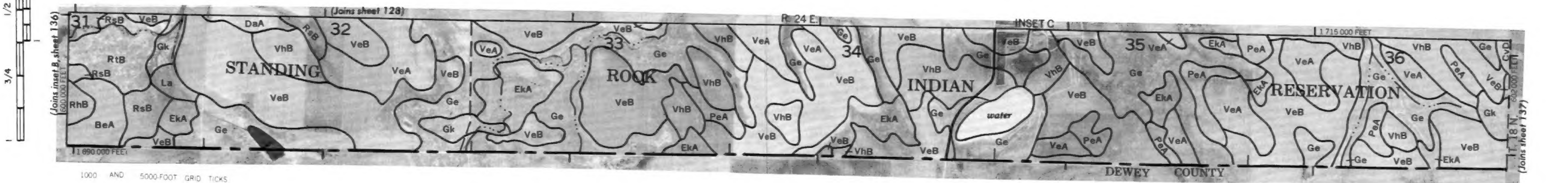
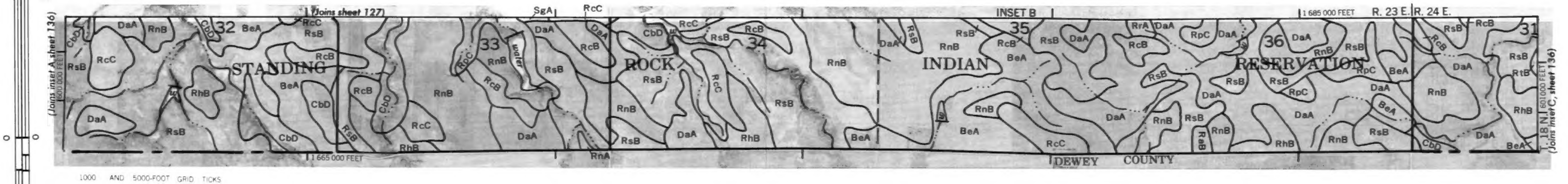
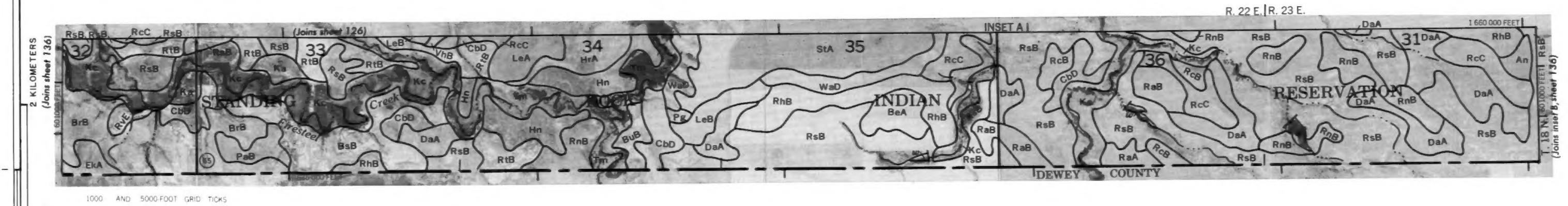
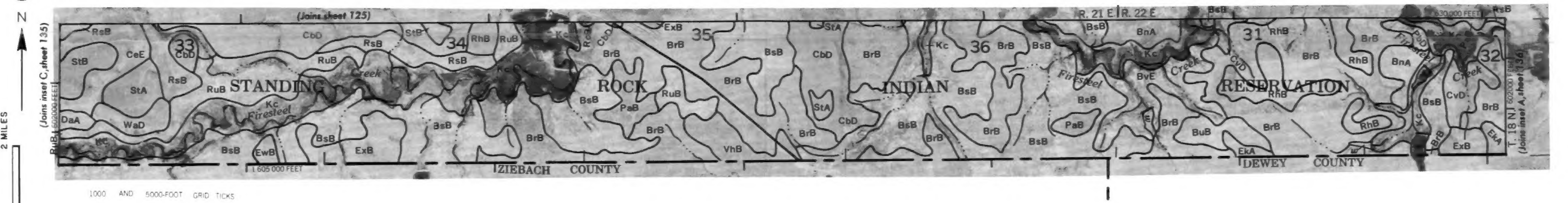
Coordinate grid ticks and land division corners, if shown, are approximately positioned

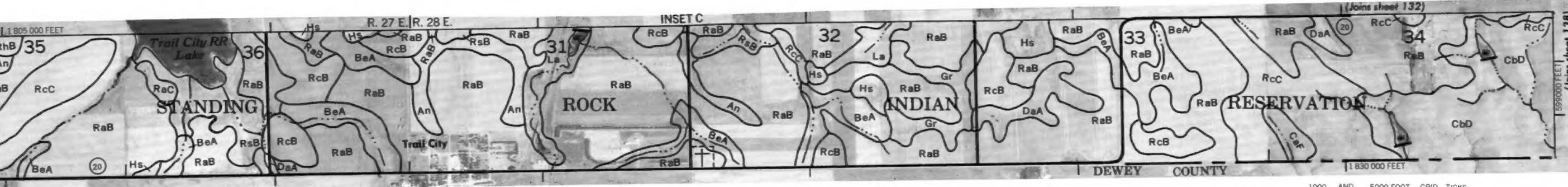
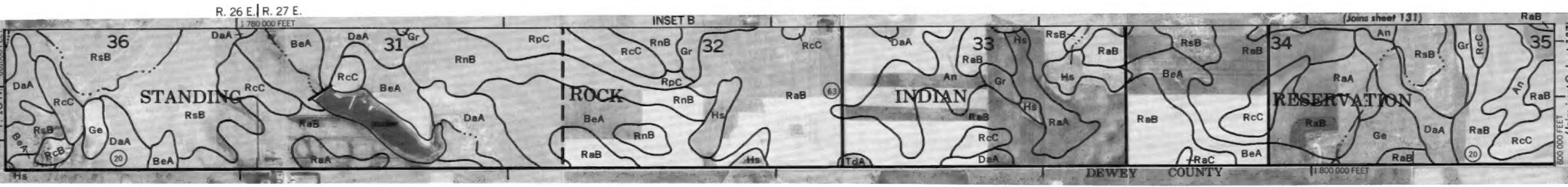
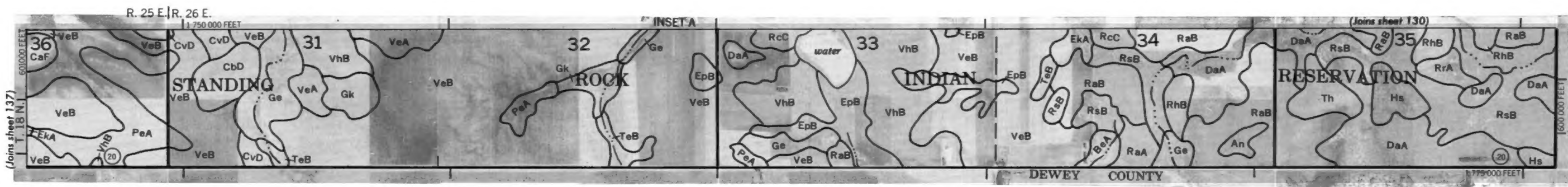
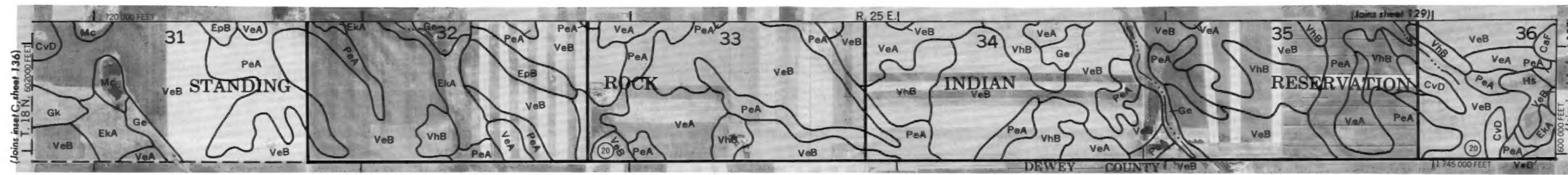






CORSON COUNTY, SOUTH DAKOTA NO. 135
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CORSON COUNTY, SOUTH DAKOTA NO. 137
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